Part 5 Sales control

This final part consists of two chapters, the first of which considers sales forecasting and budgeting. The sales forecast is important because it is from this forecast that sales, marketing and company plans are based. If the forecast is incorrect then plans for the business will also be incorrect. The place of forecasting in planning is considered in terms of levels of accuracy required in forecasting. An explanation is given of quantitative techniques and qualitative techniques of forecasting as well as the strengths and weaknesses of each. The budgetary process is then examined with particular emphasis on the sales budget. This can be described as the sum total of all of the projected sales of individual members of the salesforce. This is achieved through individual sales targets and quotas.

Salesforce evaluation concludes the book. Chapter 17 examines the salesforce evaluation process and the reasons why this is important for the company. Measures of performance are considered, including quantitative and qualitative measures. A key question to be asked in the context of evaluation relates to winning or losing orders. Questioning skills and the ability to identify weak and strong answers are considered to be useful here. Finally, the role of appraisal interviewing is discussed.

16 Sales forecasting and budgeting

OBJECTIVES

After studying this chapter, you should be able to:

1. Recognise the position of sales forecasting in the marketing planning system
2. Understand qualitative forecasting techniques
3. Understand quantitative forecasting techniques
4. Appreciate how computer software is used in forecasting
5. Understand the part budgets play in the smooth running of an organisation
6. Comprehend how the sales budget is derived and its purpose

KEY CONCEPTS

- budget allocation
- causal techniques
- diffusion models
- market forecasting
- qualitative forecasting techniques
- quantitative forecasting techniques
- sales budget
- time series analysis

16.1 PURPOSE

It is of utmost importance that the sales manager has some idea of what will happen in the future in order that plans can be made in advance. There would otherwise be no point in planning and all that has been said in the previous chapter would be negated. Many sales managers do not recognise that sales forecasting is their responsibility and leave such matters to accountants, who need the forecast in order that they can prepare budgets (dealt with later). Sales managers do not always see the immediate need for forecasting and feel that selling is a more urgent task. Indeed, the task of forecasting by the sales manager is often delayed until the last minute and a hastily put together estimation with no scientific base, little more than an educated guess, is the end result. The folly of such an attitude is examined during this chapter.

When one is in a producer's market – similar to the situations in the immediate post-war years as described in Chapter 1 – there is less of a need for forecasting as the market takes up all one's production; it is less a matter of selling and more a matter of allowing customers to purchase. However, in a buyer's market the situation is different. The consequence of over-production is unsold stock which is costly to finance from working capital borrowings. The marginal money, i.e. the cost of borrowing the last unit of revenue, comes from the bank overdraft, which is at least base rate of borrowing plus 1 or 2 per cent. It can therefore be seen that over-production and holding stock can be costly. Conversely, under-production can be detrimental as sales opportunities might be missed due to long delivery times and business might pass to a competitor that can offer quicker delivery.

Thus the purpose of the sales forecast is to plan ahead and go about achieving forecasted sales in what management considers to be the most effective manner. It is again emphasised that the sales manager is the person who should be responsible for this task. The accountant is not in a position to know whether the market is about to rise or fall; all that can be done is to extrapolate from previous sales, estimate the general trend and make a forecast based on this. The sales manager is the person who should know which way the market is moving, and it is an abrogation of responsibility if the task of sales forecasting is left to the accountant. In addition, the sales forecasting procedure must be taken seriously because from it stems business planning. If the forecast is flawed then business plans will also be incorrect.

16.2 PLANNING

It has been established that planning stems from the sales forecast and the purpose of planning is to allocate company resources in such a manner as to achieve these anticipated sales.

A company can forecast sales either by forecasting market sales (called **market forecasting**) and then determining what share of this will accrue to the company or by forecasting the company's sales directly. Techniques for doing this are dealt with later in the chapter. The point is that planners are only interested in forecasts when the forecast comes down to individual products in the company.

We now examine the applicability and usefulness of the short-, medium- and long-term forecasts in so far as company planners are concerned and look at each from individual company departmental viewpoints.

1. *Short-term forecasts*. These are usually for periods up to three months ahead and are really of use for tactical matters such as production planning. The general trend of sales is less important here than short-term fluctuations.
2. *Medium-term forecasts*. These have direct implications for planners. They are of most importance in the area of business budgeting, the starting point for which is the sales forecast. Thus, if the sales forecast is incorrect, then the entire budget is incorrect. If the forecast is over-optimistic then the company will have unsold stocks, which must be financed out of working capital. If the forecast is pessimistic then the firm may miss out on marketing opportunities because it is not geared up to produce the extra goods required by the market. More to the point is that when forecasting is left to accountants, they will tend to err on the conservative side and produce a forecast that is lower than the trend of sales, the implications of which have just been described. This serves to re-emphasise the point that sales forecasting is the responsibility of the sales manager. Such medium-term forecasts are normally for one year ahead.
3. *Long-term forecasts*. These are usually for periods of three years and upwards depending on the type of industry being considered. In industries such as computers three years is considered long-term, whereas for steel manufacture ten years is a typical long-term horizon. They are worked out from macro-environmental factors such as government policy, economic trends, etc. Such forecasts are needed mainly by financial accountants for long-term resource implications and are generally the concern of boards of directors. The board must decide what its policy is to be in establishing the levels of production needed to meet the forecasted demand; such decisions might involve the construction of a new factory and the training of a workforce.

In addition to the functions already mentioned under each of the three types of forecast, other functions can be directly and indirectly affected in their planning considerations as a result of the sales forecast. Such functions include the following:

1. It has been mentioned that production needs to know about sales forecasts so that they can arrange production planning. There will also need to be close and speedy liaison between production and sales to determine customer priorities in the short term. Production also needs long-term forecasts so that capital plant decisions can be made in order to meet anticipated sales.
2. Purchasing usually receives its cue to purchase from production via purchase requisitions or bills of material. However, in the case of strategic materials or long-delivery items it is useful for purchasing to have some advance warning of likely impending material or component purchases in order that they can better plan their purchases. Such advance warning will also enable purchasing to purchase more effectively from a price and delivery viewpoint.
3. Human resource management is interested in the sales forecast from the staffing planning viewpoint.
4. It has already been mentioned that the financial and, more specifically, costing functions need the medium-term forecast to budget. Later in this chapter we discuss the role of the sales forecast in the sales budgetary procedure and how such a function

operates. The long-term forecast is of value to financial accountants in that they can provide for long-range profit plans and income flows. They also need to make provision for capital items such as plant and machinery needed in order to replace old plant and machinery and to meet anticipated sales in the longer term.

5. Research and development (R&D) will need forecasts, although their needs will be more concerned with technological matters and not with actual projected sales figures. They will want to know the expected life of existing products and what likely changes will have to be made to their function and design in order to keep them competitive. Market research reports will be of use to R&D in that they will be able to design and develop products suited to the marketplace. Such a view reflects a marketing orientated approach to customer requirements. Here reports from salespeople in the field concerning both the company's and competitors' products will be useful in building up a general picture; such information will be collated and collected by the marketing research function.
6. Marketing needs the sales forecast so that sales strategies and promotional plans can be formulated in order to achieve the forecasted sales. Such plans and strategies might include the recruitment of additional sales personnel, remuneration plans, promotional expenditures and other matters as detailed in Chapters 3 and 4.

A useful model, proposed by Hogarth, involved three interactive forecasting components: the person performing the task of forecasting, the actions that are a consequence of that person's judgements and the ultimate outcome of that judgement.[1] This model is shown in Figure 16.1.

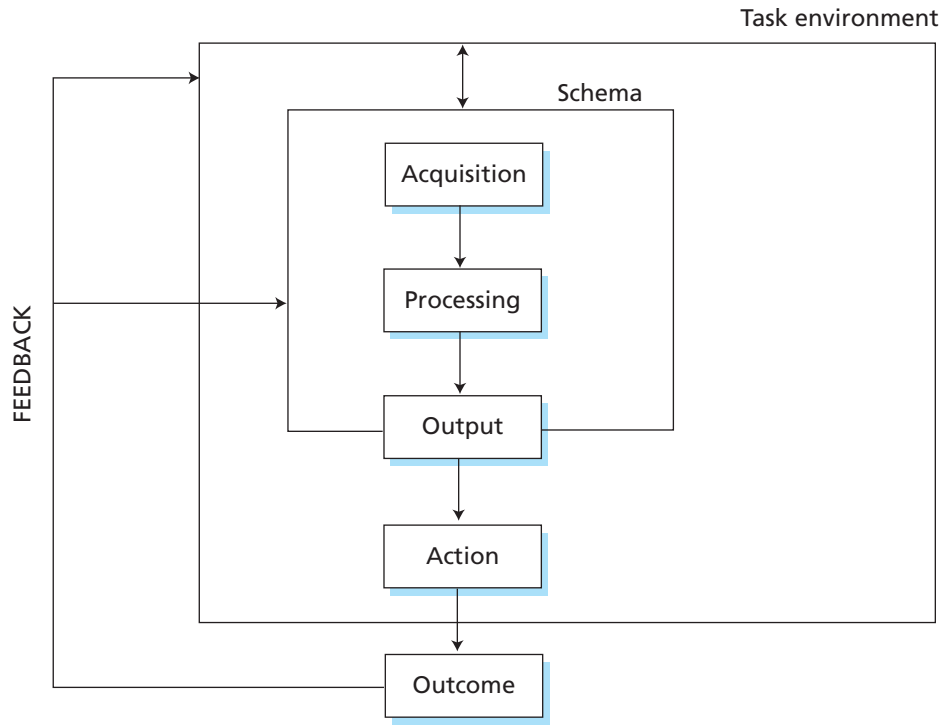

Figure 16.1 A conceptually based model of judgemental forecasting

Source: Hogarth, R. (1975) 'Cognitive processes and the assessment of subjective probability distributions', *Journal of the American Statistical Association*, 70 (350), pp. 271–89.

The individual making the forecast is represented in the scheme in terms of beliefs relating to the forecasting task. This judgement relates to acquiring and processing information and the output from this information. This is then translated into action, which is the sales forecast. The outcome refers to action that, along with external factors, then produces the final forecast. Feedback points are included as corrective measures that might be needed as the forecast becomes reality.

It can thus be seen that an accurate forecast is important because all functions base their plans on such forecasts. The short-, medium- and long-term forecasts all have relevance to some business function and, in the absence of reasonably accurate forecasting, where such plans are not based on a solid foundation, they will have to be modified later as sales turn out to be different from those predicted in the sales forecast.

Now that the purpose of sales forecasting has been established, together with its role as a precursor to all planning activity, we can look at the different types of forecasting technique, bearing in mind that such forecasting is the responsibility of the sales function. Such techniques are split into two types: qualitative techniques and quantitative techniques.

16.3 LEVELS OF FORECASTING

Forecasts can be produced for different horizons starting at an international level and ranging down to national levels, by industry and then by company levels until we reach individual product-by-product forecasts. The forecast is then broken down seasonally over the time span of the forecasting period and geographically right down to individual salesperson areas. These latter levels are of specific interest to sales management, for it is from here that the sales budgeting and remuneration systems stem, as we discuss later in the chapter.

However, companies do not generally have to produce international or national forecasts as this information is usually available from recognised international and national sources. The company forecaster finds such data useful for it is by using such information that product-by-product forecasts can be adjusted in the light of these macro-level predictions. It is also from these market forecasts that the company can determine what share it will be able to achieve through its selling and marketing efforts. These marketing efforts involve manipulating the marketing mix in order to plan how to achieve these forecasted sales (e.g. a price reduction could well mean more sales will be possible). Once it reaches a detailed level of product-by-product forecasting, geographically split over a time period, it is then termed the ‘sales forecast’, which is more meaningful to sales management. Indeed, it could be said that this is the means through which sales management exercises control over the field salesforce and, as we describe later, this is the revenue-generating mechanism for the entire sales organisation of a company as seen in the example that follows.

A vision of the future

Only a few years ago, the flat screen television revolution looked like being the saviour of what had become an industry in its mature stage with sales and profit growth static or declining.

In developed economies at least by the end of the 1990s sales of television had peaked. Most households had at least one television and often several. New sales were confined to customers replacing their existing televisions often only after a period of several years.

Because of this many for many of the major companies or brands in this market such as Sony, Panasonic and Phillips the future looked bleak for what in the past had been a very profitable market for them.

Then along came a number of breakthroughs in technology which led among other things to the introduction of the flat screen television.

Despite their initially high prices the market loved the new product. Televisions could now look sleek and slim and customers rushed out to replace their old bulky televisions with them.

As a result companies such as Sony once more turned their attention to the television side of their business. Vast sums were invested in refining and developing the product with larger and larger screens being produced. The often substantial amounts of research and development and marketing budgets required to grow the market were to be amply repaid by the forecast of anticipated sales and profit margins based on the price premium and levels of demand that the new flat screen products could command.

By 2008, the average price of an entry level 32-inch television in the UK was £250–300. Five years previously a similar set would have cost in the region of £800–900. Sony are thought to have lost in the region of £300 million in the television part of its business.

So what has gone wrong?

In fact, the major manufacturers were right in their forecast for demand for these products. They were and still are a major sale success. Customers are stiil switching from their old bulky sets and the product life cycle for televisions has taken off again.

However, what many of the major manufacturers, including Sony failed to predict was the intense price competition that would be encountered in this market causing prices and profit margins to drop significantly. Perhaps the major brands should have anticipated and planned for this, but even the marketers of televisions don't always have perfect vision.

Source: Written by Frank Withey, University of Huddersfield.

16.4 QUALITATIVE TECHNIQUES

Qualitative forecasting techniques are sometimes referred to as judgemental or subjective techniques because they rely more on opinion and less on mathematics in their formulation. They are often used in conjunction with the quantitative techniques described in section 16.5.

Consumer/user survey method

This method involves asking customers about their likely purchases for the forecast period, sometimes referred to as the market research method. For industrial products, where there are fewer customers, such research is often carried out by the salesforce on a face-to-face basis. The only problem is that then you have to ascertain what proportion of their likely purchases will accrue to your company. Another problem is that customers (and salespeople) tend to be optimistic when making predictions for the future. Both of these problems can lead to the possibility of multiplied inaccuracies.

For consumer products it is not possible to canvass customers through the salesforce. The best method is to interview customers through a market research survey (probably coupled with other questions or through an omnibus survey where questions on a questionnaire are shared with other companies). Clearly, it will only be possible to interview a small sample of the total population and because of this the forecast will be less accurate. There is also a question of the type and number of questions one can ask on such a sample survey. It is better to canvass grades of opinion when embarking on such a study and these grades of opinion can reflect purchasing likelihoods. One can then go on to ask a question as to the likelihood of purchasing particular makes or brands which will, of course, include your own brand or model.

This method is of most value when there are a small number of users who are prepared to state their intentions with a reasonable degree of accuracy. It tends, therefore, to be limited to organisational buying. It is also a useful vehicle for collecting information of a technological nature which can be fed to one's own research and development function.

Panels of executive opinion

This is sometimes called the jury method, where specialists or experts are consulted who have knowledge of the industry being examined. Such people can come from inside the company and include marketing or financial personnel or, indeed, people who have a detailed knowledge of the industry. More often, the experts will come from outside the company and can include management consultants who operate within the particular industry. Sometimes external people can include customers who are in a position to advise from a buying company's viewpoint. The panel thus normally comprises a mixture of internal and external personnel.

These experts come with a prepared forecast and must defend their stance in committee among the other experts. Their individual stances may be altered following such discussions. In the end, if disagreement results, mathematical aggregation may be necessary to arrive at a compromise.

This type of forecasting method is termed a 'top-down' method whereby a forecast is produced for the industry. The company then determines what its share will be of the overall forecast. Because the statistics have not been collected from basic market data (from the 'bottom-up') there is difficulty in allocating the forecast out among individual products and sales territories, and any such allocation will probably be arbitrary. Thus the forecast represents aggregate opinion and is only useful when developing a general, rather than specific product-by-product forecast.

A variation of this method is termed 'prudent manager forecasting' whereby company personnel are asked to assume the position of purchasers in customer companies. They must then look at company sales from a customer's viewpoint and 'prudently' evaluate sales, taking into consideration such factors as external economic conditions, competitive offerings in terms of design, quality, delivery and price and whatever other factors are considered relevant to making an evaluation of the company's sales.

Salesforce composite

This method involves each salesperson making a product-by-product forecast for their particular sales territory. Thus individual forecasts are built up to produce a company forecast; this is sometimes termed a 'grass-roots' approach. Each salesperson's forecast must be agreed with the manager, and divisional manager where appropriate, and eventually the sales manager agrees the final composite forecast.

Such a method is a bottom-up approach. Where remuneration is linked to projected sales (through quotas or targets) there can be less cause for complaint because the forecast upon which remuneration is based has been produced by the salesforce itself.

A variation of the above method is termed 'detecting differences in figures' and here each stage in the hierarchy produces a set of figures before meeting. The salesperson produces figures, broken down by product and customer, and the area manager produces figures for the salesperson's territory. They then meet and must reconcile any differences in figures. The process proceeds with the area manager producing territory-by-territory figures and meeting with the regional manager who will have produced figures for the area, until it eventually reaches the sales manager and the entire forecast is ultimately agreed.

The immediate problem with the salesforce composite method of forecasting is that when the forecast is used for future remuneration (through the establishment of sales quotas or targets) there might be a tendency for salespeople to produce a pessimistic forecast. This can be alleviated by linking selling expenses to the forecast as well as future remuneration.

When remuneration is not linked to the sales forecast there is a temptation to produce an optimistic forecast in view of what was said earlier about customers and

salespeople tending to overestimate. The consequence of the above is that a forecast might be produced that is biased either pessimistically or optimistically. As a corollary to the above it can also be argued that salespeople are too concerned with everyday events to enable them to produce objective forecasts and they are perhaps less aware of broader factors affecting sales of their products. Thus their forecasts will tend to be subjective.

Delphi method

This method bears a resemblance to the 'panel of executive opinion' method and the forecasting team is chosen using a similar set of criteria. The main difference is that members do not meet in committee.

A project leader administers a questionnaire to each member of the team which asks questions, usually of a behavioural nature, such as 'Do you envisage new technology products supplanting our product lines in the next five years? If so, by what percentage market share?' The questioning then proceeds to a more detailed or pointed second stage which asks questions about the individual company. The process can go on to further stages where appropriate. The ultimate objective is to translate opinion into some form of forecast. After each round of questionnaires the aggregate response from each is circulated to members of the panel before they complete the questionnaire for the next round, so members are not completing their questionnaires in a void and can moderate their responses in the light of aggregate results.

The fact that members do not meet in committee means that they are not influenced by majority opinion and a more objective forecast might result. However, as a vehicle for producing a territory-by-territory or product-by-product forecast it has limited value. It is of greater value in providing general data about industry trends and as a technological forecasting tool. It is also useful in providing information about new products or processes that the company intends to develop for ultimate manufacture and sale.

Bayesian decision theory

This technique has been placed under qualitative techniques, although it is really a mixture of subjective and objective techniques. It is not possible to describe the detailed workings of this method within the confines of this text; indeed it is possible to devote a whole text to the Bayesian technique alone.

The technique is similar to critical path analysis in that it uses a network diagram and probabilities must be estimated for each event over the network. The basis of the technique can best be described by reference to a simple example. As this chapter does not easily lend itself to the provision of a case study that can encompass most or all of the areas covered, a practical exercise, followed by questions covering Bayesian decision theory, has been included at the end of the chapter which should give the reader an insight into its workings.

Product testing and test marketing

This technique is of value for new or modified products for which no previous sales figures exist and where it is difficult to estimate likely demand. It is therefore prudent to estimate likely demand for the product by testing it on a sample of the market beforehand.

Product testing involves placing the pre-production model(s) with a sample of potential users beforehand and noting their reactions to the product over a period of time by asking them to fill in a diary noting product deficiencies, how it worked, general reactions, etc. The type of products that can be tested in this manner can range from household durables, for example, vacuum cleaners, to canned foods such as soups. However, there is a limit to the number of pre-production items that can be supplied (particularly for consumer durables) and the technique is really of value in deciding between a 'go' or 'no go' decision.

Test marketing is perhaps of more value for forecasting purposes. It involves the limited launch of a product in a closely defined geographical test area, for example, a test town such as Bristol or a larger area such as the Tyne-Tees Television area. Thus a national launch is simulated in a small area representative of the country as a whole, obviously at less expense. It is of particular value for branded foodstuffs. Test market results can be grossed up to predict the national launch outcome. However, the estimate can only cover the launch. Over time, the novelty factor of a new product might wear off. In addition, it gives competitors an advantage because they can observe the product being test marketed and any potential surprise advantage will be lost. It has also been known for competitors deliberately to attempt to sabotage a test marketing campaign by increasing their promotional activity in the area over the period of the test market, thereby introducing additional complications when assessing the final results.

16.5 QUANTITATIVE TECHNIQUES

Quantitative forecasting techniques are sometimes termed objective or mathematical techniques as they rely more upon mathematics and less upon judgement in their computation. These techniques are now very popular as a result of sophisticated computer packages, some being tailor-made for the company needing the forecast.

It is not proposed to go into the detailed working of such techniques because they require specialist skills in their own right; indeed a single technique could take up an entire textbook. Some quantitative techniques are simple while others are extremely complex. We now explain such techniques so you will have an appreciation of their usefulness and applicability. If the forecasting problem calls for specialist mathematical techniques then the answer is to consult a specialist and not attempt it on the basis of incomplete information given here. Quantitative techniques can be divided into two types:

1. *Time series analysis*. The only variable that the forecaster considers is time. These techniques are relatively simple to apply, but the danger is that too much emphasis might be placed upon past events to predict the future. The techniques are useful in predicting sales in markets that are relatively stable and not susceptible to sudden

irrational changes in demand. In other words, it is not possible to predict downturns or upturns in the market, unless the forecaster deliberately manipulates the forecast to incorporate such a downturn or upturn.

2. ***Causal techniques***. It is assumed that there is a relationship between the measurable independent variable and the forecasted dependent variable. The forecast is produced by putting the value of the independent variable into the calculation. One must choose a suitable independent variable and the period of the forecast to be produced must be considered carefully. The techniques are thus concerned with cause and effect. The problem arises when one attempts to establish reasons behind these cause and effect relationships; in many cases there is no logical explanation. Indeed, there is quite often nothing to suppose that the relationship should hold good in the future. Reasoning behind causal relationships may not be too clear at this stage, but once the techniques are examined later in the chapter it should become self-evident. The first set of techniques examined are those concerned with **time series analysis**.

Quantitative techniques (time series)

Moving averages

This method averages out and smooths data in a time series. The longer the time series, the greater will be the smoothing. The principle is that one subtracts the earliest sales figure and adds the latest sales figure. The technique is best explained through the simple example given in Table 16.1. It can be seen that using a longer moving average produces a smoother trend line than using a shorter moving average.

Table 16.1 Office Goods Supplies Ltd: Annual sales of briefcases, moving average

		Three-year		Five-year	
Year	**Number**	**Total**	**Average**	**Total**	**Average**
1994	1,446	—	—	—	—
1995	1,324	4,179	1,393	—	—
1996	1,409	3,951	1,317	6,543	1,309
1997	1,218	3,773	1,258	6,032	1,206
1998	1,146	3,299	1,100	5,855	1,171
1999	935	3,228	1,076	5,391	1,078
2000	1,147	3,027	1,009	4,953	991
2001	945	2,872	957	4,810	962
2002	780	2,728	927	5,049	1,008
2003	1,003	2,957	986	4,706	941
2004	1,174	2,981	994	4,805	961
2005	804	3,022	1,007	5,186	1,037
2006	1,044	3,009	1,003	5,470	1,094
2007	1,161	3,492	1,164	—	—
2008	1,287	—	—	—	—

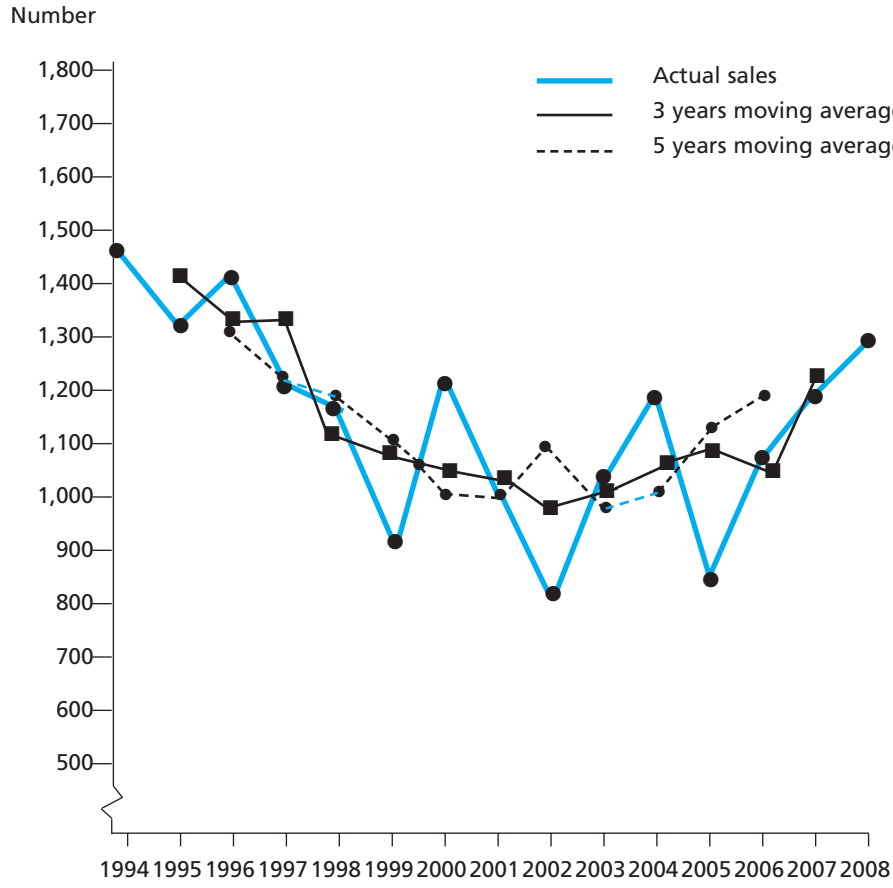

Figure 16.2 Office Goods Supplies Ltd: annual sales of briefcases, moving average

These data are reproduced graphically (see Figure 16.2) and it can be seen that averaging smooths out the annual sales figures. Five-year averaging produces a smoother line than three-year averaging. One can then produce a forecast by extending the trend line, and it is up to the individual forecaster to decide whether three-year or five-year averaging is better. Indeed, it is sometimes unnecessary to smooth the data (in the case of a steady trend) and the technique is then termed trend projection. Generally speaking, the more the data fluctuate, the more expedient it is to have a longer averaging period.

Exponential smoothing

This is a technique that apportions varying weightings to different parts of the data from which the forecast is to be calculated. The problem with moving averages and straightforward trend projection is that it is unable to predict a downturn or upturn in the market (unless the forecaster deliberately places a downturn or upturn in the data). In this technique the forecaster apportions appropriate degrees of 'typicality' to different parts of the time series.

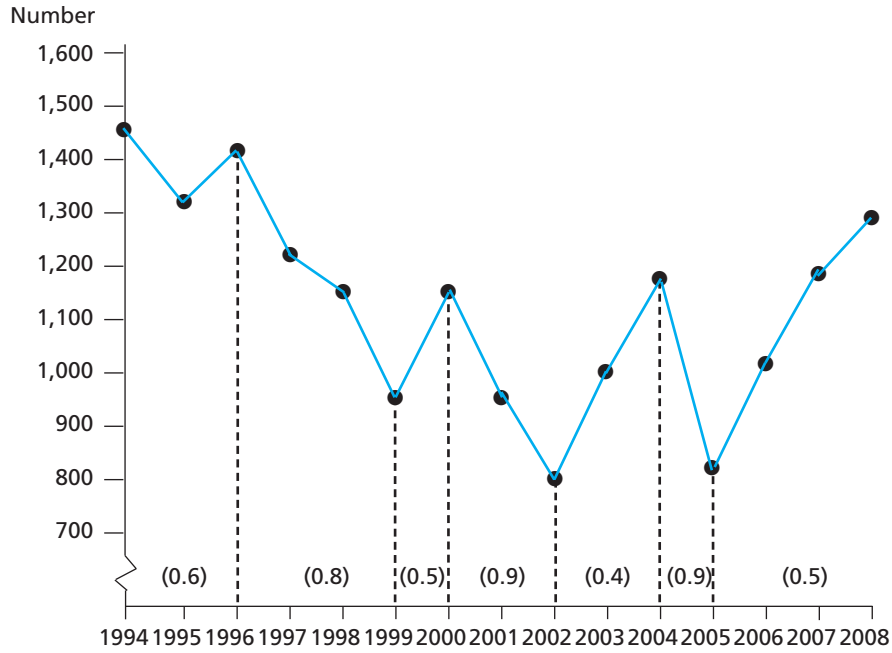

Figure 16.3 Office Goods Supplies Ltd: annual sales of briefcases, exponential smoothing (weighting shown in brackets)

It is not proposed to explain the detailed mathematics behind the technique because this is not a sales forecasting textbook. Instead, the statistics used in the previous example have been taken and from these weightings have been applied to earlier parts of the series. These weightings are applied by the forecaster according to their own judgement as to how 'typical' earlier parts of the data are in the production of a forecast (although there is a mathematical technique for deciding this if necessary). The result is shown in Figure 16.3.

In the moving averages technique the forecast will take some time to respond to a downturn or upturn, whereas with the exponential smoothing method the response can be immediate. In the example in Figure 16.3 the forecaster has apportioned greater weightings to downturn periods of trade than to upturn periods, and the forecast will thus reflect another downturn period for 2009. Had a moving averages forecast been used, this would have produced a less steep continuum of the 2007–8 upturn trend.

In practice the technique is simple to operate, but it is essentially a computer technique. The forecaster can very simply alter the smoothing constant for different periods to produce a number of alternative forecasts. The skill lies in determining the degree of weightings for earlier and later parts of the time series.

Time series analysis

This technique is useful when seasonality occurs in a data pattern. It is of particular use for fashion products and for products that respond to seasonal changes throughout the year. It can be used for cyclical changes in the longer term (such as patterns of

Table 16.2 Office Goods Supplies Ltd: Quarterly sales of briefcases

Year	Quarter	Unit sales	Quarterly moving total	Sum of pairs	Divided by 8 to find trend	Deviations from trend
2004	1	207				
	2	268	= 1,174	= 2,295	287	−64
	3	223	1,121	2,136	267	+209
	4	476	1,015	= 1,934	242	−88
2005	1	154	919	1,723	215	−53
	2	162	= 804	= 1,643	205	−78
	3	127	839	1,779	222	+139
	4	361	940	= 1,935	242	−53
2006	1	189	995	2,039	255	+8
	2	263	= 1,044	= 2,110	264	−82
	3	182	1,066	2,156	269	+141
	4	410	1,090	= 2,197	275	−64
2007	1	211	1,107	2,268	284	+3
	2	287	= 1,161	= 2,346	293	−94
	3	199	1,185	2,433	304	+160
	4	464	1,248	= 2,497	312	−77
2008	1	235	1,249	2,536	317	+33
	2	350	= 1,287			
	3	200				
	4	502				

trade) but there are better techniques available for dealing with such longer-term trends. Thus its best application is where the seasonal pattern is repeated on a fairly regular annual basis. These seasonal movements are measured in terms of their deviation from the aggregate trend.

The technique is best explained graphically by using data from the previous example. The quarterly sales of briefcases have been taken for Office Goods Supplies Ltd for the years 2004–08 (see Table 16.2), and it can be seen that sales exhibit a seasonal pattern, with a peak of sales in the final quarter of each year.

When the sums of quarterly deviations from the trend are added, the resultant sum is +40 in this particular case (see Table 16.3). The total sum must equal zero, otherwise it would mean that a positive bias would be built into the forecast. However, this correction must come from all figures equally, and is calculated as:

$$40/4 = +10$$

Therefore +10 must be subtracted from each quarter's figures. The corrected figures are then:

Quarter	1	2	3	4
Corrected deviations	−292	−19	−328	+639 = 0

Table 16.3 Office Goods Supplies Ltd: Sum of quarterly deviations from trend

Quarter	1	2	3	4
Year				
2004	—	−53	−64	+209
2005	−88	−53	−78	+139
2006	−53	+8	−82	+141
2007	−64	+3	−94	+160
2008	−77	+33	—	—
Sum	−282	−9	−318	+649 = +40

Table 16.4 Office Goods Supplies Ltd: Forecasted trend figures and deviations from trend that have been applied

Year	Period	Trend	Deviation	Forecast
2008	3	326	−82	244
	4	334	+160	494
2009	1	343	−73	270
	2	352	−5	347
	3	360	−82	278
	4	369	+160	529

In this particular example these figures must now be divided by 4 to produce a yearly aggregate (because four years' data have been used in their compilation) and the figures from which the forecast will be derived are as follows:

Quarter	1	2	3	4
Deviations	−73	−5	−82	+160 = 0

The figures in Table 16.4 are an extension of data at the end of Table 16.2 and these have been derived as follows. Unit sales are added to provide a one-year total. This total then summates the one-year moving sales by taking off the old quarter and adding on the new quarter. The quarterly moving totals are then paired in the next column (to provide greater smoothing) and this sum is then divided by 8 to ascertain the quarterly trend. Finally, the deviations from trend are calculated by taking the actual figure (in unit sales) from the trend, and these are represented in the final column as deviations from the trend.

The statistics are then incorporated into a graph and the unit sales and trend are drawn in as in Figure 16.4. The trend line is extended by sight (and it is here that the forecaster's skill and intuition must come in). The deviations from trend are then applied to the trend line, and this provides the sales forecast.

In the example in Figure 16.4 it can be seen that the trend line has been extended on a slow upwards trend similar to the previous years. The first two figures for periods 3 and 4 of 2008 are provided as a forecast, as this is a function of the calculation. These two periods of course passed, and it can be seen that the forecast is slightly different from what happened in reality. Proof that forecasting is never perfect! The four quarters of 2009 have been forecasted and these are included in the graph.

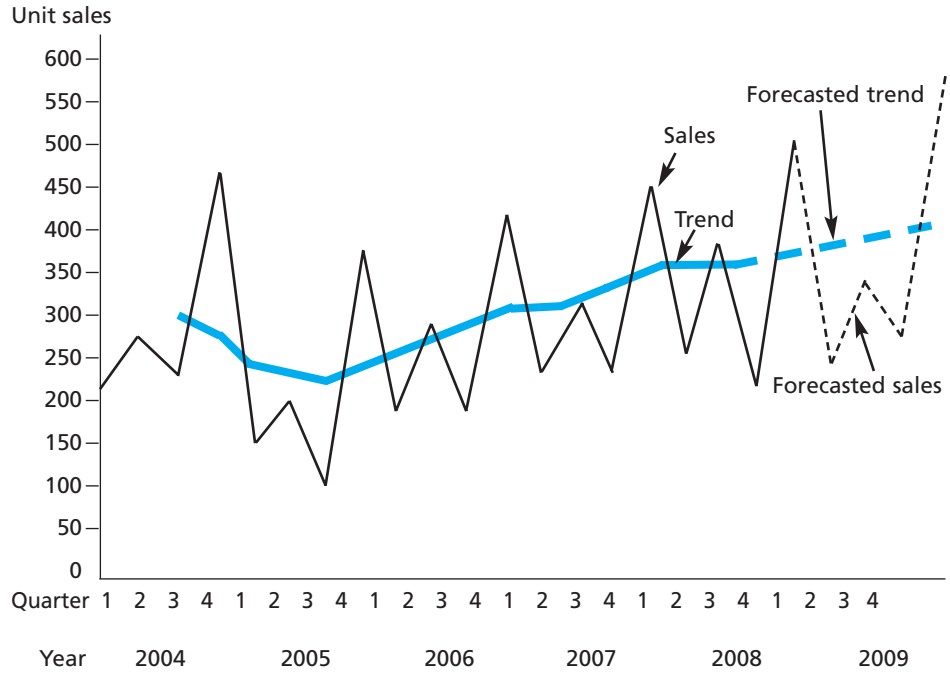

Figure 16.4 Office Goods Supplies Ltd: quarterly sales of briefcases and one-year forecast

The technique, like many similar techniques, suffers from the fact that downturns and upturns cannot be predicted, and such data must be subjectively entered by the forecaster through manipulation of the extension to the trend line.

Z (or zee) charts

This technique is merely a furtherance of the moving averages technique. In addition to providing the moving annual total, it also shows the monthly sales and cumulative sales; an illustration of the technique shows why it is termed Z chart. Each Z chart represents one year's data and is best applied using monthly sales data. As a vehicle for forecasting it provides a useful medium where sales for one year can be compared with previous years using three criteria (monthly, cumulative and moving annual).

The sales of briefcases for Office Goods Supplies Ltd have been provided for each month of 2007 and 2008 and this is sufficient to provide data for the Z chart as can be seen in Table 16.5. The figures in Table 16.5 are then transposed graphically in Figure 16.5.

Moving annual sales are obtained by adding on the new month's figure and taking off the old month's figure, 12 months previously. The cumulative sales are obtained by adding each month to the next month, and the bottom line of the Z is the monthly sales.

The method is very much a comparison by sight method and in this case would be used for the medium-term (one-year) sales forecast. However, as a serious method for prediction its uses are limited; its main use is for comparison.

Table 16.5 Office Goods Supplies Ltd: Monthly sales of briefcases 2007–08

Month	Unit sales 2007	2008	Cumulative sales 2008	Moving annual total
Jan	58	66	66	1,169
Feb	67	70	136	1,172
Mar	86	99	235	1,185
Apr	89	102	337	1,198
May	94	121	458	1,225
Jun	104	127	585	1,248
Jul	59	58	643	1,247
Aug	62	69	712	1,254
Sep	78	73	785	1,249
Oct	94	118	903	1,273
Nov	178	184	1,087	1,279
Dec	192	200	1,287	1,287

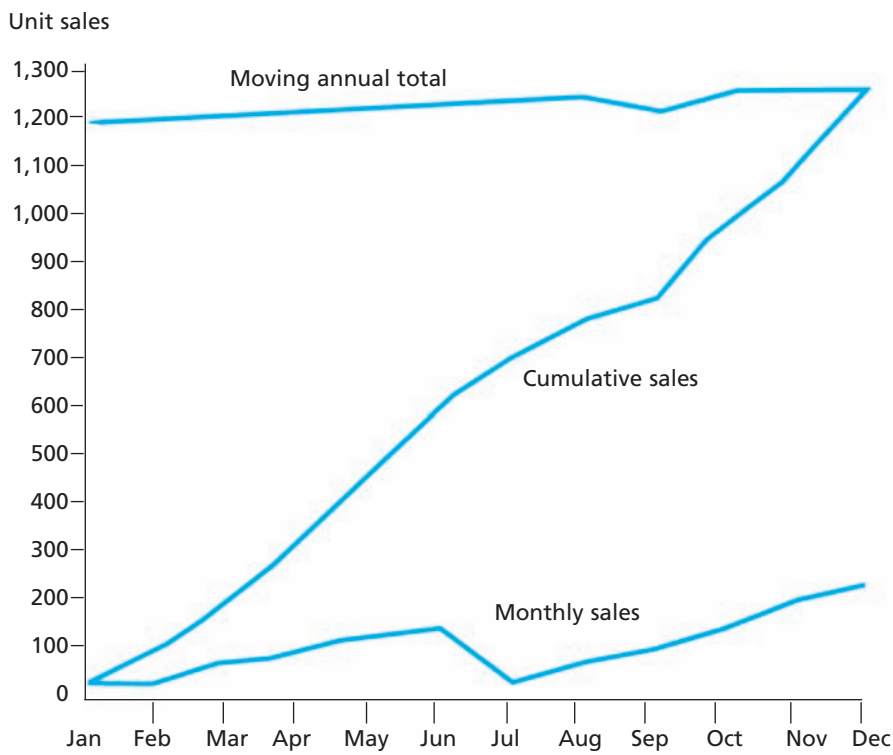

Figure 16.5 Office Goods Supplies Ltd: monthly sales of briefcases, Z chart for 2008

Miscellaneous

This final section briefly outlines two computer-based techniques; to describe their workings in detail would take a disproportionate amount of space together with a detailed knowledge of mathematics. They rely in their application upon sophisticated computer packages. If the reader wishes to pursue the techniques further, then a software specialist would advise on their applicability and the degree of accuracy for the desired intention. This is not to say that the forecaster (say the sales manager) should necessarily need to have a detailed knowledge of the technique that is being applied. All they need to know is what the forecast will do and its degree of accuracy.

The first of these techniques is Box-Jenkins, which is a sophistication of the exponential smoothing technique that applies different weightings to different parts of the time series. In the case of this technique, the computer package takes earlier parts of the time series and manipulates and weights parts of this against known sales from later parts of the time series. The weighting that provides the best fit is finally deduced and can then be used for the forecast. It is reasonably accurate for short- and medium-term forecasting.

The other technique is termed X-11 and was developed by an American named Julius Shiskin. It is a decomposition technique and breaks a time series down into trend cycles, seasonal cycles and irregular elements. It is an effective technique for medium-term forecasting and incorporates a number of analytical methods into its computation.

Quantitative techniques (causal)

Leading indicators

This method seeks to define and establish a linear regression relationship between some measurable phenomenon and whatever is to be forecasted. It is not appropriate to enter into a discussion of the technique of linear regression within the confines of this text; should you wish to pursue the technique further, most reasonably advanced statistical texts will adequately describe the method and its applicability.

The best way to explain the technique is to consider the following simple example. The sale of children's bicycles depends upon the child population, so a sensible leading indicator for a bicycle manufacturer would be birth statistics. The bicycle manufacturer will therefore seek to establish a relationship between the two and, if the manufacturer is considering children's first two-wheeler bicycles (say, at age three years old, on average) then births will precede first bicycles by three years. In other words first bicycles will lag births by three years.

The example is obviously an over-simplification, and there are forecasting packages available that permute a number of leading indicators; i.e. they are indicators that are ahead of actual sales. It is possible to provide the permutation that best fits known sales, where the sales are lagged in time and the indicator is leading. The

permutation that best fits the known sales to the indicator (or permutation of indicators) is the one to use in the forecast. Thus the permutation is constantly under review as time goes on. As forecasts pass into actual sales, so the forecasting permutation is modified to take account of most recent sales.

This more sophisticated type of forecasting uses what is known as correlation analysis to establish the relationship. Again the reader is directed to any reasonably advanced statistics text for a fuller explanation of its workings and implications.

Simulation

This forecasting methodology has become possible with the widespread use of computers. Leading indicator forecasting establishes relationships between some measurable phenomenon and whatever is to be forecasted, while simulation uses a process of iteration, or trial and error, to arrive at the forecasting relationship. In a reasonably complicated forecasting problem (which most are that utilise this technique) the number of alternative possibilities and outcomes is vast. When probabilities of various outcomes are known, the technique is known as Monte Carlo simulation and depends upon a predetermined chance of a particular event occurring (it is no coincidence that the technique derives from probabilities worked out for gambling games).

We cannot explain the technique further without entering into complex mathematical discussions and explanations. In so far as this text is concerned, it is sufficient that you are aware of the technique; if further information is required, an expert forecaster should be consulted.

Diffusion models

Most of the techniques discussed so far have depended upon a series of past sales for the company and the industry to be available before a forecast can be calculated. However, when new products are introduced to the market which are not simply extensions or redesigns of old products, then the technique for estimating sales comes from a body of theory called the diffusion of innovations. One of the authors made a study of the subject 20 years ago and produced a forecast for video-recorders that utilised the Bass **diffusion model**.[2]

Again, as with most causal techniques, the mathematics are complicated and the best advice for the sales manager seeking to apply such a technique to a new product would be to seek the advice of a specialist. This is essentially a computer technique and its computation is complicated. Basically, diffusion theory assumes that the new product has four basic units:

- the innovation;
- the communication of the innovation among individuals;
- the social system; and
- time.

The theory goes on to say that the innovation can be categorised into one of the following groupings:

- continuous;
- dynamically continuous; and
- discontinuous.

This is a hierarchical listing, with the innovations being more widely removed from previous technology as one moves further down the list. This means that the further down the hierarchy the innovation is placed, the lower will be the degree of likely acceptance. In the early days of a product innovation, knowledge must be communicated to as many individuals as possible, especially those who are likely to be influential in gaining wider appeal for the innovation. This communication process is broken down into formal and informal communication. These two elements are fed into the forecasting model and as such the model can be applied without large amounts of past sales data. The formal communication is controlled by the company and includes such data as advertising expenditure and sales support for the launch and the informal element relates to such matters as family and reference group influences.

Once the innovation has been launched, a measure of the rate of adoption is needed in order to produce a useful forecast. Products are born, they mature and eventually die, and it is important to the forecaster using this technique that the first few points of the launch sales are known in order to be able to determine the rate of adoption. Thus a forecast can be made using only a small amount of data covering the early launch period. An assumption is therefore made that the product being considered has a life-cycle curve and that new product acceptance is through a process of imitation, i.e. later purchasers will follow the innovators.

Use of computer software in sales forecasting

Software has been written designed specifically for forecasting purposes. The problem with any listing of such software is that it quickly dates, so if it is proposed to use a software package then the best advice is to consult an up-to-date listing. The following is a list of more generalised packages that have withstood the test of time.

EXEC*U*STAT from Mercia Software Ltd. Combines business statistics with high-quality graphics output. It provides for quick analysis of data.

FOCA from Timberlake Clark Ltd. Offers modern quantitative forecasting of time series using exponential smoothing, spectral analysis, Box-Jenkins and adaptive filtering.

MINITAB from CLE.COM Ltd. A general-purpose data analysis system that is easy to use. Its features include descriptive statistics, regression analysis with diagnostics, residual analysis and step-wise procedures, time series analysis including robust smoothers and Box-Jenkins operations.

RATS from Timberlake Clark Ltd. An econometric package that performs time series and cross-sectional regression. It is designed for forecasting of time series, although small cross-sectional and panel data may also be used.

SAS/ETS from SAS Software Ltd. An econometrics and time series library which provides forecasting, planning and financial reporting. It contains procedures for time series analysis, linear and non-linear systems simulation and seasonal adjustments, and its applications include econometric modelling and cash-flow planning as well as sales forecasting.

SORITEC from Timberlake Clark Ltd. Includes non-linear and simultaneous estimation techniques, simultaneous non-linear simulation and solution, a full matrix processing language and transfer function estimation.

SPSS-PC+ from SPSS (UK) Ltd. A fully interactive data analysis package with full screen editing facilities, data entry and validation and a range of analytical and reporting procedures.

STATGRAPHICS from Cocking & Drury Ltd. A statistical and graphics package that includes plotting functions (2D and 3D), descriptive methods, estimation and testing, distribution fitting, exploratory data analysis, analysis and variance, regression analysis, time series analysis including Box-Jenkins ARIMA modelling, multivariate and non-parametric methods and experimental design.

STATPAC GOLD from Molimerx Ltd with batch and interactive processing and good graphics that requires less memory than most other packages.

This listing only documents those packages that are available in Britain; many more are available in the United States.

16.6 BUDGETING – PURPOSES

It was outlined at the beginning of this chapter that an organisation needs to budget to ensure that expenditure does not exceed planned income. It has been shown that the sales forecast is the starting point for business planning activities. The company costing function takes the medium-term sales forecast as its starting point, and from this budgets are allocated to departments (or cost centres). Budgets state limits of spending; they are thus a means of control. The company can plan its profits based upon anticipated sales, minus the cost of achieving those sales (which is represented in the total budget for the organisation).

The consequence of an incorrect medium-term forecast can be seen as the company profit plan will be incorrect. It has already been mentioned, but is re-emphasised here, that if the forecast is pessimistic and the company achieves more sales than those forecast, then potential sales might be lost owing to unpreparedness and insufficient working finance and facilities being available to achieve those sales. Conversely, if the forecast is optimistic and sales revenue does not match anticipated sales, then revenue problems will arise, with the company having to approach a lender – probably a bank – to fund its short-term working capital requirements (which can be expensive if interest rates are high). This latter factor is a prime cause of many business failures, not necessarily because of bad products or a bad salesforce, but through insufficient money being available to meet working capital needs. These

problems stem from incorrect medium-term forecasting in the first place. The following budgeting practice used by Kraft gives an illustration of budgeting methods.

Alternative types of budgeting

There are a number of budgeting types to choose from. Kraft uses a mix of the following:

1. *Zero based budgeting:* In a dynamic business it often makes sense to 'start afresh' when developing a budget rather than basing ideas too much on past performance. This is appropriate to Kraft because the organisation is continually seeking to innovate. Each budget is therefore constructed without much reference to previous budgets. In this way, change is built into budget thinking.
2. Strategic *budgeting:* This involves identifying new, emerging opportunities, and then building plans to take full advantage of them. This is closely related to zero based budgeting and helps Kraft to concentrate on gaining *competitive advantage*.
3. *Rolling budgets:* Given the speed of change and general uncertainty in the external environment, shareholders seek quick results. US companies typically report to shareholders every three months, compared with six months in the United Kingdom. Rolling budgets involve evaluating the previous twelve months' performance on an ongoing basis, and forecasting the next three months' performance.
4. *Activity based budgeting:* This examines individual activities and assesses the strength of their contribution to company success. They can then be ranked and prioritised, and be assigned appropriate budgets.

Source: http://www.thetimes100.co.uk/case_study with permission.

16.7 BUDGET DETERMINATION

Departmental budgets are not prepared by cost accountants. Cost accountants, in conjunction with general management, apportion overall budgets for individual departments. It is the departmental manager who determines how the overall departmental budget will be utilised in achieving the planned-for sales (and production). For instance, a marketing manager might decide that more needs to be apportioned to advertising and less to the effort of selling in order to achieve the forecasted sales. The manager therefore apportions the budget accordingly and may concentrate upon image rather than product promotion; it is a matter of deciding beforehand where the priority lies when planning for marketing.

Thus, the overall sales forecast is the basis for company plans, and the sales department budget (other terms include sales and marketing department budget, and marketing department budget) is the basis for marketing plans in achieving those forecasted sales. The sales department budget is consequently a reflection of marketing's forthcoming expenditure in achieving those forecasted sales.

At this juncture it is useful to make a distinction between the *sales department budget* and the *sales budget* (see section 16.8). The sales department budget is merely the budget for running the marketing function for the budget period ahead. Cost accountants split this sales department budget into three cost elements:

1. The *selling expense budget* includes those costs directly attributable to the selling process, e.g. sales personnel salaries and commission, sales expenses and training.
2. The *advertising budget* includes those expenses directly attributable to above-the-line promotion (e.g. television advertising), and below-the-line promotion (e.g. a coupon redemption scheme). Methods of ascertaining the level of such a budget are as follows:
   (a) A percentage of last year's sales.
   (b) Parity with competitors, whereby smaller manufacturers take their cue from a larger manufacturer and adjust their advertising budget in line with the market leader.
   (c) The affordable method, where expenditure is allocated to advertising after other cost centres have received their budgets. In other words, if there is anything left over it goes to advertising.
   (d) The objective and task method calls for ascertainment of the advertising expenditure needed to reach marketing objectives that have been laid down in the marketing plan.
   (e) The return on investment method assumes that advertising is a tangible item that extends beyond the budget period. It looks at advertising expenditures as longer-term investments and attempts to ascertain the return on such expenditures.
   (f) The incremental method is similar to the previous method; it assumes that the last unit of money spent on advertising should bring in an equal unit of revenue.

   (a) assumes that increasing sales will generate increasing promotion and vice versa, whereas the converse might be the remedy, i.e. a cure for falling sales might be to increase the advertising spend; (b) assumes status quo within the marketplace; (c) does not really commend itself because the assumption is that advertising is a necessary evil and should only be entered into when other expenditures have been met. It quite often happens in times of company squeezes that advertising is the first item to be cut because of its intangibility. The cure for the company ailment might rest in increased promotional awareness; (d) seems to make sense, but accountants contend that marketing personnel will state marketing objectives without due regard to their value, and such objectives may not sometimes be related to profits; (e) and (f) seem to make sense, but the main difficulties are in measuring likely benefits such as increased brand loyalty resulting from such advertising expenditures, and determining when marginal revenue equals marginal expenditure. In practice, firms often use a combination of methods, e.g. methods (d) and (e), when deciding their advertising budget.
3. The *administrative budget* represents the expenditure to be incurred in running the sales office. Such expenses cover the costs of marketing research, sales administration and support staff.

The marketing manager (or person responsible for the marketing and selling functions) must then determine, based on the marketing plan for the year ahead, what

portion of the sales department budget should be allocated to each of the three parts of the budget described above. Such expenditure should of course ensure that the forecasted sales will be met as the forecasting period progresses.

What has been stated so far relates to the sales department budget; the sales budget itself has not been dealt with. The sales budget has far more implications for the company and merits a separate section by way of explanation.

16.8 THE SALES BUDGET

The **sales budget** may be said to be the total revenue expected from all products that are sold, and as such this affects all other aspects of the business. Thus, the sales budget comes directly after the sales forecast.

It can be said that the sales budget is the starting point of the company budgeting procedure because all other company activities are dependent upon sales and total revenue anticipated from the various products that the company sells. This budget affects other functional areas of the business, namely finance and production, because these two functions are directly dependent upon sales. Figure 16.6 best explains the sales budgeting procedure.

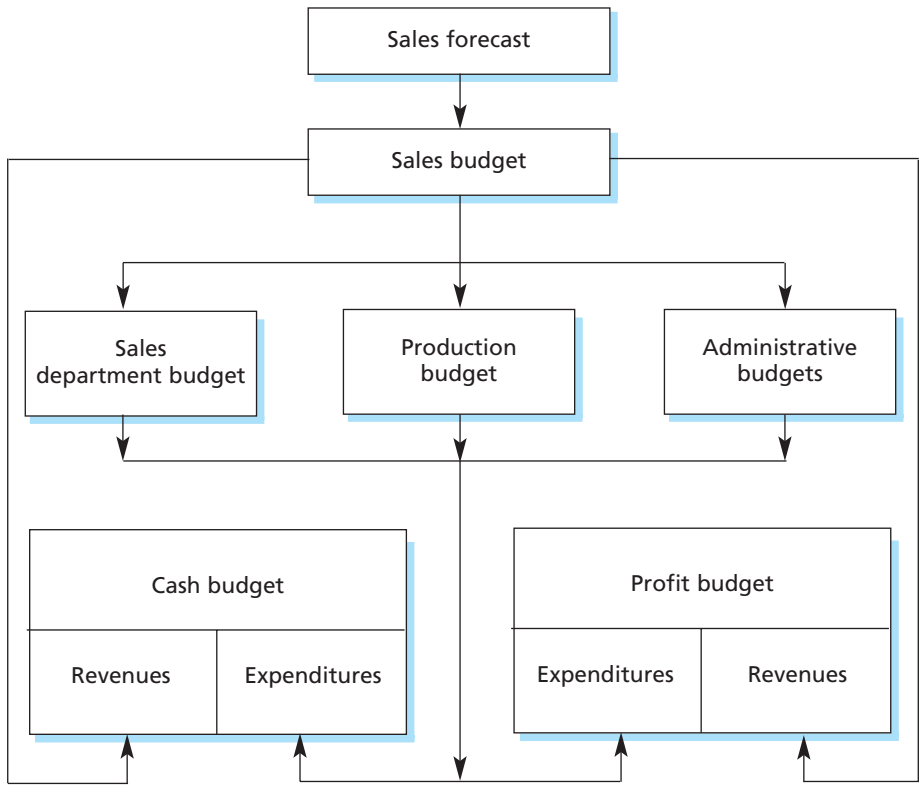

Figure 16.6 The budgetary process

Figure 16.6 represents the way that cost accountants view the budgeting procedure. From the sales budget comes the sales department budget (or the total costs in administering the marketing function). The production budget covers all the costs involved in actually producing the products. The administrative budget covers all other costs such as personnel, finance, etc., and costs not directly attributable to production and selling.

The sales budget is thus the revenue earner for the company and other budgets represent expenditures incurred in achieving the sales. Cost accountants also have cash budgets and profit budgets, each with revenue provided from company sales. It is not proposed to go into why they split into cash and profit budgets. If you want to know more about the mechanisms involved here, then any basic text on cost accountancy should provide an explanation.

16.9 BUDGET ALLOCATION

The sales budget is a statement of projected sales by individual salespeople. The figure that reaches the individual salesperson is sometimes called the sales quota or sales target and this is the amount that must be sold in order to achieve the forecasted sales. Such quotas or targets are therefore performance targets that must be reached, and quite often incentives are linked to salespeople reaching (and surpassing) such quotas or targets. Such incentives have already been covered in Chapters 14 and 15.

Each salesperson knows the individual amount they must sell to achieve their quota, and such quotas are effectively performance targets. Quotas need not necessarily be individually based, but can be group based – say, collectively throughout a region – with everybody from the regional or area manager downwards equally sharing the sales commission. Quotas may also be for much shorter periods than the one year. The entire year's budget may be broken down in the same manner, say, month by month. When administered like this the time horizon is more realistic and immediate than one year. Thus, there is more of an incentive for a salesperson to achieve the quota or target.

For established firms the most common practice of budget allocation is simply to increase (or decrease) last year's individual budgets or quotas by an appropriate percentage, depending on the change in the overall sales budget. However, periodically it is sensible to review individual sales quotas to establish if they are reasonable given current market conditions.

The first step in this procedure is to attempt to determine the sales potential of territories. Usually surrogate measures will be employed to give at least relative measures of potential. For consumer products, disposable incomes and number of people in the target market may be used to assess relative potential. For industrial products, the number and size of potential customers may be used. Another factor to be taken into account is workload. Obviously two territories of equal potential may justify different quotas if one is compact while the other is more widespread. By assessing sales potential for territories and allowing for workload, the overall sales budget can be allocated in as fair a manner as possible between salespeople.

Not only does the sales quota act as an incentive to the salesforce but it also acts as a prime measure of performance. Chapter 17 looks in detail at the whole area of evaluation of sales personnel.

16.10 CONCLUSIONS

The purpose of sales forecasting has been explained and it has been emphasised that this function rests with sales management. Its importance to the planning process has been established; without reasonably accurate forecasting, planning will be in vain. The purpose of forecasting has been considered in the short, medium and long term, and the usefulness of each has been established within the major functions of any manufacturing or service concern.

Forecasting has been considered under the headings of qualitative and quantitative techniques, with the latter being split into time series methods and causal methods. Qualitative techniques and time series methods have been explained in the amount of detail required to give you a working knowledge of their application. However, causal methods depend largely upon the use of the computer, and computation relies to a great extent upon advanced mathematics. As such, the techniques have been described, but not explained in workable detail.

Finally, the importance of the sales budget in motivating and controlling the salesforce was considered. The sales budget, which is determined by the sales forecast, is broken down into sales quotas or targets for individual salespeople and regions. Monetary incentives may be linked to the attainment of quotas and may be used as a yardstick of achievement.

References

[1]Hogarth, R. (1975) 'Cognitive processes and the assessment of subjective probability distributions', *Journal of the American Statistical Association*, 70 (350), pp. 271–89.

[2]Lancaster, G.A. and Wright, G. (1983) 'Forecasting the future of video using a diffusion model', *European Journal of Marketing*, 17, p. 2.

PRACTICAL EXERCISE

Classical Reproductions Ltd

Background to the application of Bayesian decision theory

It has been mentioned throughout the chapter that since the 1960s we have seen the development of sophisticated statistical techniques for problem-solving where information is incomplete or uncertain. The new area of statistics has a variety of names – statistical decision theory, simple decision theory and Bayesian decision theory (after the Reverend Thomas Bayes, 1702–61). These names can be used interchangeably, but for the purposes of this case we use the term Bayesian decision theory.

Bayesian decision theory is a relatively new and somewhat controversial method for dealing with future uncertainties. Applied to forecasting, the technique incorporates the firm's own guesses as data inputs into the calculation of a sales forecast. There are essentially two ways of conceiving probability:

- as a physical property, inherent to a physical system;
- as a measure of belief in the truth of some statement.

Until the late 1950s most statisticians held the first view of probability, with the probability of an event being the relative frequency with which the event might occur. Since this period there has been a rethink on the meaning of probability and it is now regarded more as a measure of belief. This latter approach is termed Bayesian statistics. The Bayesian view is that probability is a measure of our belief and we can always express our degree of belief in terms of probability.

To use the Bayesian approach, the decision-maker must be able to assign a probability to each specified event or state of nature. The sum of these probabilities must add to one. These probabilities represent the strength of the decision-maker's feeling regarding the likelihood of the occurrence of the various elements of the overall problem. It is because of the subjective nature of the process in generating these probabilities that Bayesian decision-making is so useful in solving business problems for which probabilities are often unknown. It is also the reason many practitioners often reject the Bayesian approach; in fact some of the more conservative statisticians have termed it 'the quantification of error'!

In practical business problems, decisions are often delegated to persons whose levels of expertise should be such as to enable them to assign valid probabilities to the occurrences of various events. These probabilities will be subjective evaluations based on experience, intuition and other factors such as available published data, all of which are acquired prior to the time that the decision is made. For this reason such subjective probability estimates are referred to as the prior probability of an event.

In business decision-making we must decide between alternatives by taking into account the monetary repercussions or expected value of our actions. A manager who must select from a number of available investments should consider the profit and loss that might result from each option. Applying Bayesian decision theory

involves selecting an option and having a reasonable idea of the economic consequences of choosing that action.

Once the relevant future events have been identified and the respective subjective prior probabilities have been assigned, the decision-maker computes the expected payoff for each act and chooses the one with the most attractive expected payoff. If payoffs represent income or profit, the decision-maker chooses the act with the highest expected payoff.

The Bayesian technique can be used to solve quite complex problems, but in this example we give a relatively simple problem by way of illustration and explanation. However, the principles are similar for simple or difficult problems.

Bayesian decision theory applied to Classical Reproductions Ltd

This UK manufacturer of fine reproduction English furniture is considering venturing into the US market. The company is to appoint an agent who will hold stock and sell the furniture to quality retail stores.

In order for the firm to gain economies in freight charges, consignments need to be fairly large and it is planned that the first consignment will be £2 million worth of furniture.

This type of furniture is particularly fashionable in North America at present and commands high prices. The management of Classical Reproductions expect the furniture to remain heavily in demand so long as US economic conditions remain buoyant. If economic conditions take a turn for the worse, then demand and prices will fall dramatically, because such products are a deferrable purchase.

To finance the manufacture, shipping, warehousing and other costs associated with the venture, the company is raising capital from a bank. Although the venture looks sound there is uncertainty as to the future direction of the US economy over the next 12 months. The decision facing management is whether to risk going ahead with the venture now, when demand for their products is going to be high but with the possibility of the economy deteriorating, or to postpone the venture until the US economic outlook is more certain, but during which time tastes might change.

Let us assume that the management feel that the direction of the US economy could go in one of three ways in the next 12 months:

- continue to be buoyant;
- a moderate downturn; or
- a serious recession.

The direction of the economy is an event (E) or a state of nature that is completely outside the control of the company. Let us also assume that management has decided on three possible courses of action (A):

- export now while demand is high;
- delay the venture by one year; or
- delay the venture by two years.

Management has made a forecast of the likely expected profit for each of the possible courses of action for each of the three possible events, and this information is shown in the table on the next page.

Events (E)	Actions (A)	Export now (£)	Delay 1 year (£)	Delay 2 years (£)
Economic conditions remain good		800,000	600,000	500,000
Moderate downturn in economy		450,000	370,000	200,000
Economic recession		−324,000	50,000	80,000

Management wishes to make the decision that will maximise the firm's expected profit. They assign subjective prior probabilities to each of the possible events:

Event	Probability
Economic conditions remain good (A)	0.4
Moderate downturn in economy (B)	0.3
Economic recession (C)	0.3
	1.0

These prior probabilities are now incorporated into a decision tree (see Figure 16.7) which is made up of a series of nodes and branches. The decision points are denoted by a square and chance events by circles. The node on the left (square) denotes the decision the firm has to make. Each branch represents an alternative course of action or decision. Each branch leads to a further node (circle) and from this, further branches denote the chance events.

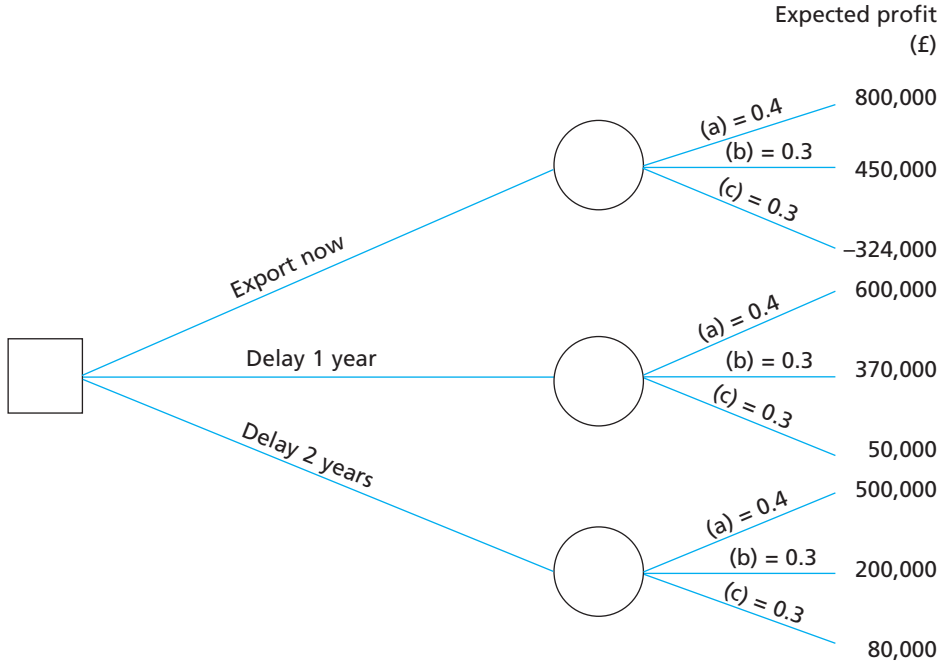

Figure 16.7 Decision tree for Classical Reproductions Ltd: (a) economy remains buoyant; (b) moderate downturn; (c) recession

The expected value (EV) should now be calculated for each forecast and then totalled for each alternative course of action. This is done in the following 'payoff table' by multiplying the expected profit for each event by their assigned probabilities and summing these products.

Action 1 – export now:

Event (E)	Probability	Expected profit (£)	Expected value (£)
A	0.4	800,000	320,000
B	0.3	450,000	135,000
C	0.3	−324,000	−97,200
Total EV for this alternative			£357,800

Action 2 – delay one year:

Event (E)	Probability	Expected profit (£)	Expected value (£)
A	0.4	600,000	240,000
B	0.3	370,000	111,000
C	0.3	50,000	15,000
Total EV for this alternative			£366,000

Action 3 – delay two years:

Event (E)	Probability	Expected profit (£)	Expected value (£)
A	0.4	500,000	200,000
B	0.3	200,000	60,000
C	0.3	80,000	24,000
Total EV for this alternative			£284,000

The firm decides to delay the venture by one year because the maximum expected payoff is associated with this. Since the act is selected under conditions of uncertainty, the EV of £366,000 is referred to as the EV under uncertainty and the act is referred to as the optimal act.

In this example the probabilities that have been assigned to events have been prior probabilities, so-called because they have been arrived at prior to the acquisition of sampling or experimental information. As a rule, these prior probabilities are subjective, representing the decision-maker's belief that various events will happen. The analysis that is carried out using these prior probabilities is called prior analysis. Following prior analysis, the decision-maker must decide whether to go ahead with the optimal act indicated by prior analysis, or to obtain further information in the hope of making a better and more certain decision.

Additional information may be obtained by conducting a survey, by carrying out an experiment or by some other means. If this additional information is acted upon, the decision-maker will have to substitute new probabilities for the prior probabilities.

Another analysis will then have to be undertaken using this new information. These new probabilities are called posterior probabilities.

Naturally, generating further information can be costly and the decision-maker must decide if the potential result is worth the cost. To extend this final point, let us find the expected value with perfect information when the prior probabilities are as follows:

(A) Economic conditions remain buoyant = 0.4
(B) Relative economic decline = 0.3
(C) Recession = 0.3

If economic conditions remain buoyant, the optimum choice would be to export now. If there is a moderate downturn in the economy, the optimum choice would still be to export now. If there is a recession, the optimal choice will be to delay for two years. Thus we find the expected value of perfect information (EVPI):

£479,000 − £366,000 = £113,000

This value of £113,000 can be interpreted as the expected opportunity loss for the optimal act under uncertainty and is the cost of uncertainty. The decision-maker can do no better than obtain perfect information, so this figure is the maximum they would be willing to pay for additional information that they know will be less than perfect.

Discussion questions

1 Carry out a full decision analysis for Classical Reproductions Ltd, using the following information.

Calculation of expected profit with perfect information

Event	Profit for optimal act	Probability	Expected value (£)
A	800,000	0.4	£320,000
B	450,000	0.3	£135,000
C	80,000	0.3	£ 24,000
			£479,000

Prior probablities for the various events for the next 12 months are:

(A) = 0.3
(B) = 0.4
(C) = 0.3

2 Carry out a pre-posterior analysis and find the expected value of perfect information (EVPI).

3 Having applied Bayesian decision theory to this example, what do you consider are its advantages and disadvantages?

PRACTICAL EXERCISE

A recipe for success

Until Dr Oetker entered the UK market with the launch of its flagship 'Pizza Ristorante' frozen pizza brand, few in Britain knew of the company that is one of Europe's leading food manufacturers. So, who is Dr Oetker?

A pharmacist from Bielefeld, Germany, Dr August Oetker founded the Oetker Group in 1891. Today the group has grown to become one of Germany's largest family-owned companies with an annual turnover of more than £3.5 billion.

And the key to this success? A simple philosophy – that 'Quality is the Best Recipe', both in business and its products.

Quality is the best recipe

Pizza Ristorante was launched in Britain in 2002 and surprisingly was the first venture into the United Kingdom for this huge German food and beverage conglomerate. Promising an authentic pizzeria taste, that's exactly what consumers got. Pizza Ristorante was soon a huge success with research indicated that 76 per cent of consumers preferred Pizza Ristorante to its competitors. It is now a well established and thriving brand in the United Kingdom.

Recipe for success

Dr Oetker has plenty of experience when it comes to launching into new markets, and is market leader in many of the 23 European countries in which its pizza brands available. The company experienced similar success in the United Kingdom. In line with the company's philosophy Pizza Ristorante was prepared from the finest ingredients to satisfy consumer demand for a quality frozen product. In addition, the company always carefully considers the needs of the particular market it is entering and the nature of the competition. In the case of the UK pizza market at the time of launch, the Thin & Crispy sector was dominated by own-label, and the company felt that the introduction of a branded product offering true quality at a competitive price could only add value. The aim was to stimulate a static market by encouraging consumers to revisit the frozen pizza category by sampling the uniquely authentic pizzeria taste Pizza Ristorante delivers.

Onwards and upwards

Spurred on by the success of its pizza launch in Britain, Dr Oetker since introduced several more of its best selling brands. For example the company's yoghurt and desserts brand 'Onken' is now established and doing well.

One of its latest UK ventures is the acquisition of the well established SuperCook range of baking and cake decorating products.

The company is now in the process of 'marrying' the Dr Oetker and SuperCook brands which will both be used on new packaging and promotional material.

Again Dr Oetker is very well established in this product area in other parts of Europe and particularly in its own country (Germany) where it has a long history of supplying baking products. As with its pizza launch there is no doubt that Dr Oetker will invest substantial resources in developing its newly acquired brand and will of course once again bring its recipe for successful marketing.

However, the UK baking product market is renowned for its conservatism. British bakers don't like their products to be messed around with and are inherently suspicious of new innovations, especially where these come from other parts of Europe.

It is also recognised that a key task in the re-launch of the brand will be persuading UK retailers and particularly the large grocery multiples to continue to support the brand and allocate shelf space.

An entirely new sales team is to be recruited and trained for this task as effective selling is seen as being crucial to the success of the relaunch.

Sources: Adapted from articles originally in *The Grocer*, 18 May 2002, p. 30; 13 July 2002, p. 48; and the website: http://www.talkingretail.com/products, 22 February 2008.

Discussion questions

1. The marketing manager for the relaunch of the SuperCook range in the United Kingdom wants a system of forecasting that will provide as accurate a picture as possible of first year sales in order to satisfy demands from head office who are sponsoring the launch of the relaunched brand. Advise this manager as to the best system she might adopt.
2. The marketing manager also wants the new salesforce to be incentivised to ensure a good product launch. She recognises the importance of the sales budget in motivating and controlling the salesforce. Advise on the best way of setting sales quotas or targets for salespeople for the relaunched brand and how these might be used as a yardstick when measuring achievement.

Examination questions

1. What is the place of sales forecasting in the company planning process?
2. Distinguish between qualitative and quantitative forecasting techniques. What are the advantages and disadvantages associated with each approach?
3. Define the differences between a sales forecast and a market forecast.
4. How might a government forecast or a forecast from a trade association be of specific use to a medium-sized company?
5. How does the sales department budget differ from the sales budget?
6. Discuss the importance of the sales budget in the corporate budgetary process.