

Sales Forecasting

Specification requirement—Nature and purpose of forecasting.

Sales forecasting: quantitative - time series analysis (extrapolation and correlation - including moving averages, seasonal and cyclical variation).

Using and interpreting market research data, test marketing.

Sales forecasting: qualitative - Delphi technique, brainstorming, intuition.

Advantages and limitations of quantitative and qualitative forecasting.

Nature and purpose of forecasting.

Sales forecasting is the art or science of predicting future demand by anticipating what consumers are likely to do in a given set of circumstances. Firms might ask what 'what will demand be if real incomes increase by 10%' or 'how much is demand likely to fall if competitor x, launches a copycat product'. Above all sales forecasting allows firms to predict sales, and once a firm has what it believes is an accurate estimate of future sales it can then predict, HRM needs, finance needs, estimate purchases etc. Sales forecasts therefore allow a firm to plan into the future.

Methods of Sales Forecasting

Whatever the firm is trying to predict, or whatever the circumstances envisaged, the same sales forecasting methods can be applied. There are both quantitative and qualitative forecasting methods. These are:

Quantitative

- Time Series Analysis.
- Use of Market Research Data

Qualitative

- Delphi Technique
- Brainstorming
- Intuition

Sales forecasting: quantitative

1. Time Series Analysis

Time series analysis uses evidence from past sales records to predict future sales patterns. There are several methods of time-series analysis that can be used.

- Seasonal Analysis - In this case, sales are measured on a monthly or weekly basis to examine the seasonality of demand.
- Trend Analysis - this focuses on long term data, which has been collected over a number of years. The objective is to determine the general trend of sales - rising, falling, or stagnant.
- Cycle Analysis. Again long term figures are used but now the objective is to examine the relationship between demand levels and economic activity. What is the relationship between demand for the product or products and the stage in the economic or business cycle?
- Random Factor Analysis. This method of analysis attempts to explain how unusual, or extreme sales figures occur. For example if sales of ice creams double for a two week period, then could this be explained by weather conditions, rather than an effective advertising campaign? Random Factor

Analysis therefore attempts to provide explanations for unusual or abnormal statistics.

dence we can build in factors such as the economic cycle, and possible marketing campaigns of competitors.

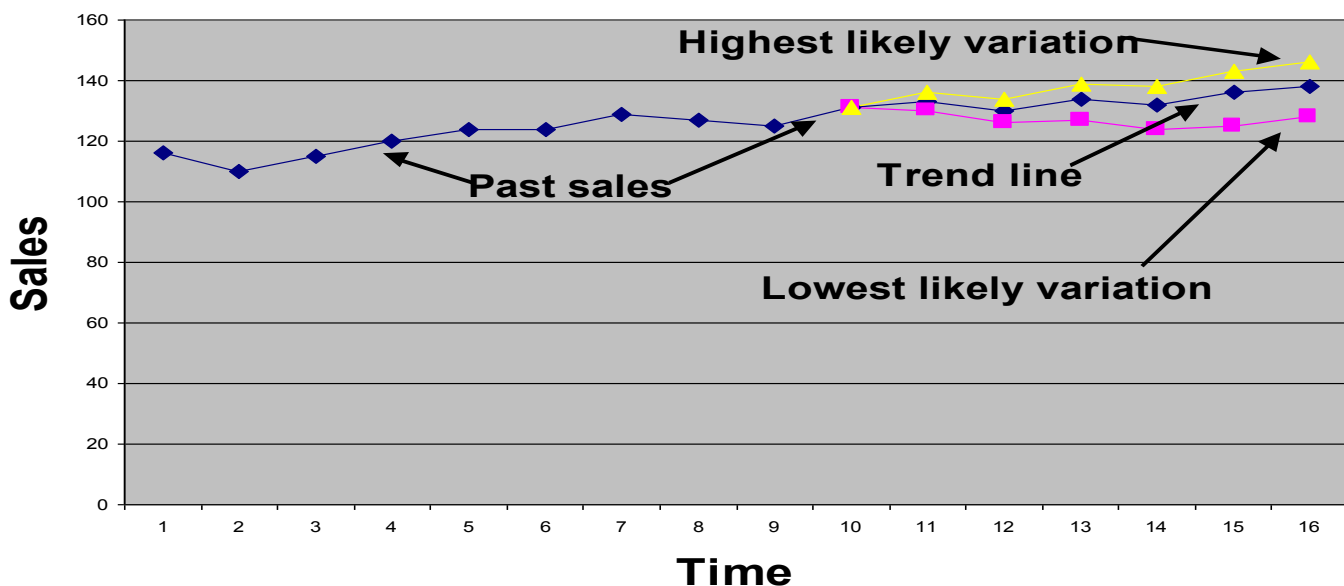
Trend Analysis and Extrapolation.

Once evidence has been gathered, the future can be predicted i.e. sales can be forecasted. Extrapolation involves taking the past and extending it into the future. So, as shown in the diagram below, if sales have grown steadily in the past at 5% a year, it might be reasonable to extrapolate from this that sales will continue to grow by 5% per year.

We can also add the idea of probability to this prediction of the future. If sales, although showing a general trend of increase, have fluctuated, we can allow for this. The outer lines show possible variations from the simple trend extrapolation. Based on past evi-

The variations from trend diagram below shows a range of likely future outcomes. Into the prediction have been added variables which will, if they were to occur, cause movements from the trend line.

Variations from Trend



Moving Averages

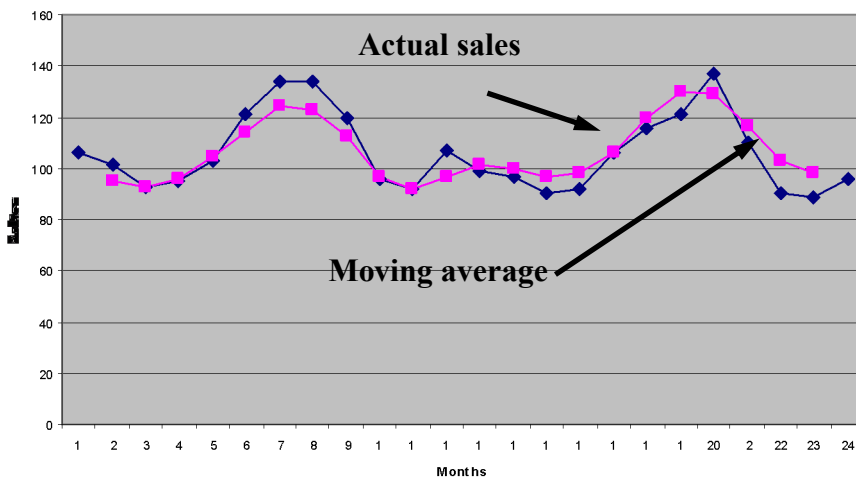
Another method of allowing for fluctuations in sales, such as those caused by seasonality, is to calculate moving averages. To show how this works we can use some sample figures. Below are monthly sales figures for Happy Valley Ice Cream for the year 2000

The effect of the calculation of a 3 month moving average is to smooth out seasonal variations. This smoothing will help us plot or predict trend, especially if we have more than 1 years figures - see graph below.

	Jan	Feb	Mar.	Apr	May	June
Sales per month	106	101	93	95	103	121
3 month total		300	289	291	319	358
Monthly moving Average		100	96.3	87	106.3	119.3
	July	Aug	Sept	Oct	Nov	Dec.
Sales per month	134	134	120	96	92	107
3 month total	389	388	350	308	295	
Monthly moving Average	129.6	129.3	116.6	102.6	98.3	

We see from the table that the worst of the variations have been removed by applying a 3 month moving average, this allows prediction of the future to be more accurate. To achieve the 3 month total we simply add together the 3 months sales that apply to each month (current month, one before, one after), to calculate the monthly moving average divide the 3 month total by 3.

Moving and Monthly Averages



If we were to examine sales over the two years 1999 and 2000 for Happy Valley and apply a 3 month moving average we would be able to see the following.

We can see that the effect of calculating the 3 month moving average has been to make future trends more predictable, by removing the worst of the

Correlation

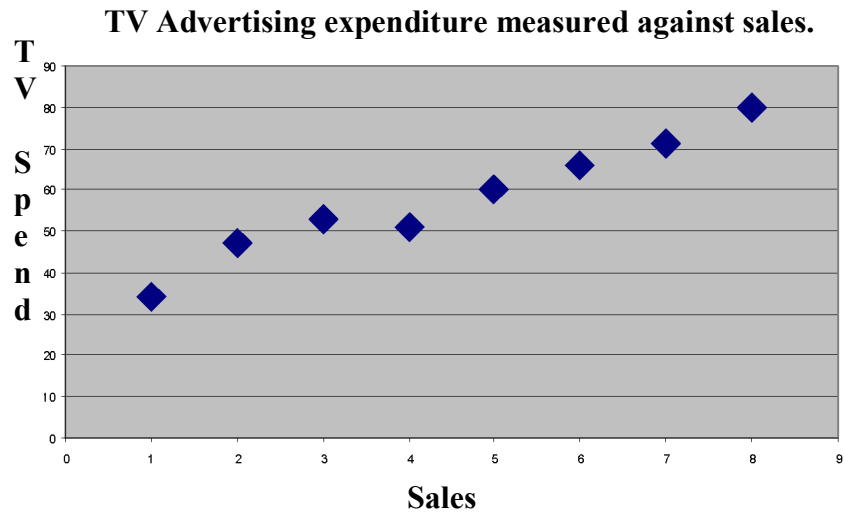
Is there a link between a firms advertising expenditure and sales? Is there a link between discounts to wholesales and orders? Correlation measures these sort of relationships.

A firm may be examining 2 variables, and trying to study the relationship that may exist between the two. A simple example might be the amount spent on TV advertising for a product and sales of the product. Those studying the relationships would plot the two variables as shown to the right (fig1). We can see a definite relationship between the two variables, as TV Ad. expenditure increases so do sales. In this situation there is strong correlation between the two.

The relationship is not always as strong as the previous example, or there may be one-off factors that affect an otherwise strong correlation.

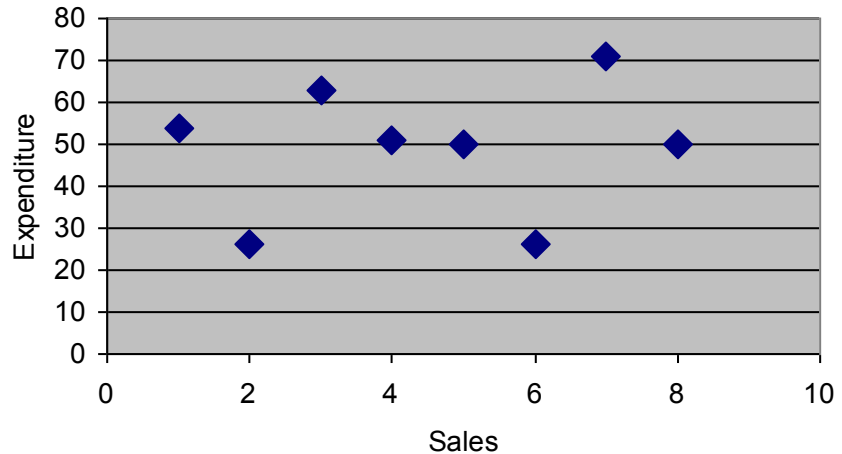
In Fig 2. there seems little or no relationship between TV advertising spend and sales, there is little or no correlation between the two variables. Now in this case you would expect a relationship to exist, so questions need to be asked to ascertain why the expected correlation does not occur.

Correlation Fig. 1



Correlation Fig. 2

Graph showing relationship between TV advertising expenditure and sales



2. Use Of Market Research Data.

Surveys of consumers intentions.

This method of forecasting predicts the future by asking people directly what they intend to do in the future. There are a number of large market research firms that are continually gathering information of this sort. They may ask consumers questions like ' do

you intend to switch to digital TV in the next month, 3 months, 6 months, year, or later', or 'in a years time do you expect to be better off, worse off, or in the same financial situation'. The results of these surveys allow firms to predict sales patterns across a wide variety of consumer durable goods. It is worth noting that results gained have to be adjusted for cultural bias, for example the Italians tend to exaggerate their likely future expenditure, or take a rosy view of the future, whilst the British are somewhat more likely to be cautious

Direct Sales Information

Sales forces and direct sales workers are those 'closest to the ground'. It is these groups that are most likely to be the first to notice developing trends, and they have the experience to spot market changes and shifts.

Direct sales information can be collected in 2 ways. Firstly by management requesting statistical predictions of future sales, and secondly by encouraging the upward flow of information through the hierarchy. These 2 methods of communication market data will provide a wide range of information, but the information received must be adjusted to fit in with the bigger picture. For example allowance must be made for economic circumstances, and also, sales people do have a habit of manipulating figures for their own benefit, e.g, predicting a bleak future for sales so that they protect themselves. This means that there must be an allowance made for bias.

Test Marketing

Test marketing involves testing consumers response to a product, before the full release of the product. Test marketing can involve release in a limited geographical area, or to a small section of the target market. For exam-

ple many movies, before they are put on general release, are test marketed, (by being shown to invited audiences), and if the response of the test marketing process is negative then changes can and are made to the movies. The response of the test market groups are used to judge if the in-house research, and opinions are applicable within the target market, and whether adjustments need to be made to the product for sales forecasts to become achievable.

Leading Indicators

Leading indicators are changes in the economy, or within markets, that indicate a future effect on a firm's own market. In the early part of 2001, the fall in consumer confidence and demand in the USA was seen as likely to have an impact on UK exports in late 2001. Within the tourist industry a fall in demand for European package tours in January and February of one year, may indicate an increase in demand for UK holidays later in the year. An increase in new build housing starts, will indicate an increase in demand for furniture perhaps 6 months later. This time delay is referred to as a 'time lag'.

Leading indicators can give strong short term indications of likely, near future fluctuations in sales levels, especially if a strong relationship has been proven in the past.

Sales forecasting: qualitative

The Delphi Technique.

To improve upon a simple gathering of expert opinion we can use the Delphi Technique The Delphi Technique was developed by the RAND Corporation in the late 1950's and it is based on researching the views of a panel of experts.

A 'delphi' begins with the initial development of a questionnaire focusing on the problem. A panel of experts is selected, then the questionnaire is sent to them. Each participant answers the questionnaire independently and returns it. Responses to the questionnaire are summarised, then a further questionnaire is developed, based on findings of first questionnaire, and is sent to the same panel of experts. The members of the expert panel independently rate and prioritise ideas included in the second questionnaire, and so on. The process is repeated until those who are investigating the issue feel positions in the expert group are firm and agreement on a topic is reached.

There are a number of advantages to using this method of market research.

- Experts can reconsider their judgements after reading feedback from other members of the expert group
- It is flexible enough to be used in a variety of situations and be applied to a range of complex problems.
- Participants have time to think through their ideas leading to a better quality of response
- The Delphi method creates a record of the expert group's responses and ideas, which can be used when needed.

But of course there are weaknesses to the method

- All depends on the content and structure of the questionnaires.
- It assumes that experts are willing to come to a consensus and allow their opinions to be altered by the views of other experts
- Expert panels often lose members be-

cause of boredom, and disillusionment with the process

- Monetary payments to the experts may lead to bias in the results of the study
- The method will more than likely require a substantial period of time to complete and can be costly in terms of the researcher's time

Brainstorming

Brainstorming is a group technique for generating new, useful ideas and promoting creative thinking.

The basis of the brainstorm is 'The Problem Statement' This Problem Statement will be the single focus of discussions. Examples of problem statements might be 'How can we improve our product range?' or 'What will be different about our market in five years time?'

The problem statement needs to be specific enough to help participants focus on the objectives of the session, but it must be open enough to allow innovative thinking and it should not be biased so it favours a particular solution or excludes creative ideas. During a brainstorm all ideas are welcome and there are no wrong answers. During brainstorming, no judgments should be made of ideas. The brainstorm will work best if members are creative in their contributions and attempt to contribute a high quantity of ideas in a short amount of time. Finally participants should not be afraid to "hitch hike" on others' ideas, i.e. build on what has already been suggested.

Brainstorming is most effective with groups of 6-12 people and works best with a varied group. So within a firm a brainstorming ses-

sion should include participants from various departments from across the organisation and with different backgrounds (qualifications, experience etc.). Even when the brainstorm is supposed to be focused on a specific, or even specialist area, outsiders can bring fresh ideas that can inspire the experts. The Brainstorm should be performed in a relaxed environment. If participants feel free to relax and joke around, they'll stretch their minds further and therefore produce more creative ideas. A brainstorming session requires a leader. This person needs to be a good listener, during the brainstorm session the leader will need to explain the rules, keep control, and ensure the session stays on track.

Intuition

For products that are new to market, or placed within immature markets, then the collection and examination of statistical evidence is much harder. There is less evidence, and the evidence there is less reliable. This makes prediction of future sales trends much harder. In this sort of situation, marketing and sales professionals often rely on their understanding and knowledge of other markets and products, that may be similar in some way, to give them an understanding of future potential - this can be referred to as using intuition or gut feeling.

The use of intuition is cheap, and fast. No need for data gathering, market testing etc. But gut feeling and experience should not be the only guide. Even if an experienced manager 'feels it in their bones', there is no excuse not to carry out test marketing exercises.

Expert opinion.

There is a huge variety of expert opinion available on most industries, and also more generalised opinion, that may also be considered by

firms trying to forecast the future. There are consultants who specialise in the motor industry, in food retailing, in internet marketing and so on. There are motor industry economists, energy economists, and political economists, all of whom have opinions on future demand and expenditure patterns. Some firms, affected by seasonal variations in sales, consult specialists on long term weather forecasts, in an attempt to predict sales of ice cream, lager, or umbrellas. Other experts to be consulted will include distributors, wholesalers, suppliers, and trade organisations.

Experts are useful for gaining specialised insights into likely future patterns and trends, but should not be used on a 'stand alone basis'. The opinion of experts should be combined with information gathered from other sources. After all the head of IBM during the 50's, said that the world would never need more than a handful of computers. In 1982, 365 economist wrote to The Times warning the then Prime Minister, Margaret Thatcher, that her policies were destroying the British economy, and that if she carried on with these policies, a fast, irreversible decline in UK wealth was inevitable. And within the last ten years Bill Gates saw no commercial future in the Internet, allowing Netscape to take the lead in developing an internet browser.

Notes