4.3 Sales forecasting (HL)

# Sales forecasting

Sales forecasting is a quantitative technique used by businesses to predict the levels of sales that they may expect in future years. These sales may be forecast either in quantity of products, or in total revenue earned. If sales forecasting is done well, the business can enjoy some benefits. If sales are expected to grow, then the business can take steps to ensure this extra demand is met. For example, inventory levels can be expanded, additional staff can be recruited if necessary, or production capacity can be increased. If companies feel they will not be able to meet their expected demand, then prices can be increased so that profits can be maximised.

If a decline in sales is forecast, then a company may choose to reduce production. Staff may be made redundant and spare land and capital may be reallocated or sold. However, a company may want to react to lower sales forecasts by increasing marketing budgets, in an attempt to fight off the predicted decline.

Businesses may also use sales forecasts to evaluate the performance of staff. Managers can use regular sales forecasts to set targets for employees. However, businesses should remember that sales forecasts do not always predict the future accurately. Businesses must remain flexible in order to react to changes in the external environment. It is also preferable to use both qualitative and quantitative analysis when making business decisions.

Managers or specialists who forecast sales use three types of sales forecasting methods. The different methods are based on the type of input data used in forecasting demand.

The three types of sales forecasting methods that specialists use are:

- causal models
- time series analysis
- qualitative techniques

# Causal models

There are a number of both internal and external factors that affect sales. Internal factors that affect sales include costs of production (spending on resources), labour turnover, and product pricing, among others. External factors include economic factors such as

incomes, or sociocultural factors such as demographic changes (see STEEPLE factors, Section 1.1.6 (/study/app/y12-business-management-a-hl-may-2024/sid-351-cid-174702/book/tool-business-plan-id-36505)).

When businesses try to find a causal relationship between one of these factors (independent variable) and sales (dependent variable), they are using a causal model. These models are constructed with data on each variable to create a scatter diagram. Then a line of best fit is used to understand the relationship between the two variables. Finally, extrapolation can be used to make predictions. You can read a full explanation of how to plot causal data, draw a line of best fit and extrapolate in Section 4.3.3 (/study/app/y12-business-management-a-hl-may-2024/sid-351-cid-174702/book/tool-simple-linear-regressions-id-38740).

# Time series analysis and moving averages

Time series analysis is a statistical technique used by businesses to identify trends in historical data, such as sales revenue figures of previous years. By assuming that past trends will continue, businesses can forecast sales in the future.

In time series data, sales are recorded by year, month, week or another time interval. Like causal models, it is useful to graph time series data so that you can see patterns. In this case, time is considered the independent variable and sales is the dependent variable. Sometimes a simple line of best fit can be drawn with time series data to see the trend and extrapolate to make a prediction.

However, there are very often significant variations in time series data. When this occurs, the data needs to be smoothed out by plotting ‘moving averages’. The smoothed data is then given a line of best fit, which can be extrapolated to make a sales forecast. The process of calculating and graphing moving averages is explained in detail in Section 4.3.3 (/study/app/y12-business-management-a-hl-may-2024/sid-351-cid-174702/book/tool-simple-linear-regressions-id-38740).

There are three main types of variations in this data: seasonal, cyclical and random variations.

## Seasonal variations

Seasonal variations in data occur when products have higher sales volumes at certain times of the year. One example of a product with seasonal variation in sales is children’s toys, for which sales peak at major gift-giving holidays in particular countries. Other

products may experience a peak in the summer months, such as sunscreen, certain clothes and holidays. Understanding and calculating seasonal variations helps businesses to improve their sales forecasts.

## Cyclical variations

Cyclical variations in sales data occur when sales are affected by the economic cycle (Section 1.1.6 (/study/app/y12-business-management-a-hl-may-2024/sid-351-cid-174702/book/tool-business-plan-id-36505)). Sales of certain goods, such as cars and televisions, increase when the economy is growing and employment is high. Sales of the same items may decline during recessions, when incomes decline and unemployment increases.

**Figure 1** shows the business cycle – the regular changes in real GDP over time.

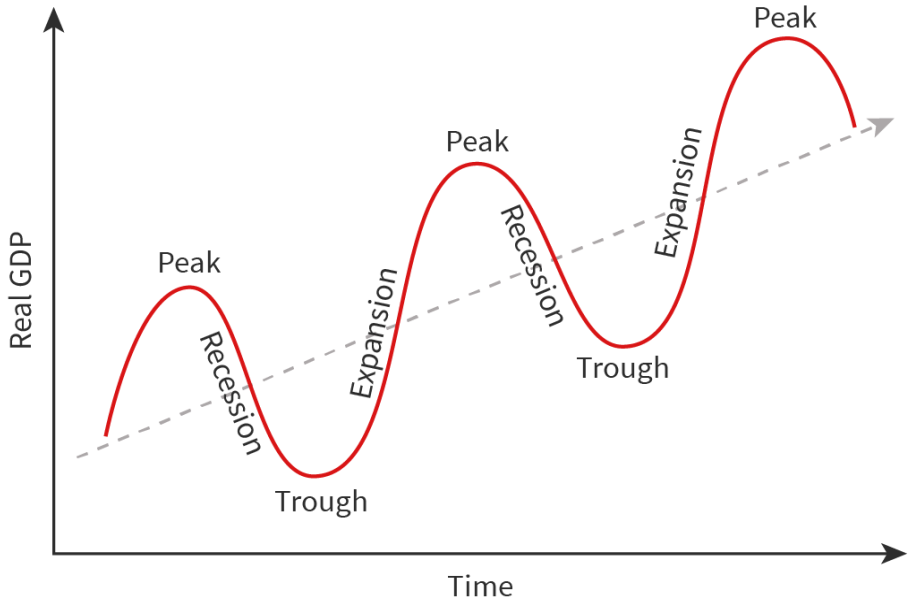


**Figure 1.** The economic cycle can lead to cyclical variations.

## Random variations

Random variations are marked changes to sales data caused by unpredictable events. Such events could include a natural disaster, a major sporting event or political unrest. Such significant events can affect sales of various products in unpredictable ways.

### Concept

**Change**

Businesses need to react to changes in the external environment when they make business decisions. Some of those changes are regular and relatively easy to include in sales forecasts. But often the external environment changes in unpredictable ways. This was true during the COVID-19 pandemic. Most businesses were not prepared for the sudden decline in sales revenue as businesses were closed and people were ordered to stay at home.

## Activity

**Random variations – events affecting sales forecasts**

Because of the occurrence of random unpredictable events, it can be very difficult for businesses to make accurate sales forecasts. Random events can seriously decrease sales revenue for businesses, and such events cannot be predicted. Moreover, there is no direct methodology to identify such trends and deviations from the trend. Below are four examples of external events that have affected sales revenues for businesses. Consider how each of these cases could represent random variations for an organisation's sales forecasting.

1. In 2020, the COVID-19 pandemic impacted businesses globally. Supply chains were impacted, and millions of people lost their jobs.
2. In 2022, BFG North Carolina recalled 1380 chests of drawers due to tip-over and entrapment hazards.
3. In 2018, Asian businesses (in particular) lost 54.7 billion USD to natural disasters, according to CNBC. That year, economic losses in North America also totalled 80.5 billion USD.
4. In 2010, British Petroleum lost control of 3.19 million barrels of oil due to a massive oil spill in the Gulf of Mexico. The company was fined a record 14 billion USD for the oil spill.

# Qualitative analysis: market research

Businesses cannot rely only on past quantitative data to make sales forecasts and decisions about their marketing mix. Businesses must also ensure that they understand broad trends in the external environment that might affect product sales. They also need to identify and forecast the buying preferences and behaviours of consumers. Thus, businesses should use qualitative analysis, such as market research (Subtopic 4.4 (/study/app/y12-business-management-a-hl-may-2024/sid-351-cid-174702/book/the-big-picture-id-38995)) before forecasting sales. A business that relied only on quantitative data from past sales to make decisions during the COVID-19 pandemic, for example, would have failed very quickly.

# Uses and limitations of sales forecasting

## Theory of Knowledge

Identifying sales trends is an important source of information for making business decisions. Trends can alert businesses to opportunities and threats in the external environment, and businesses can react accordingly. However, the world is an unpredictable place and the future is always uncertain. This raises the issue of how much businesses should rely on past experience to guide decision-making. Consider the following questions:

- To what extent is the past a reliable guide for the future?
- Are predictions in the human sciences inevitably unreliable?

Sales forecasts rely on past trends to predict the future. While these forecasting techniques can provide useful information for business decisions, they are not always accurate. As mentioned above, random variations such as the COVID-19 pandemic had an enormous impact on businesses as well as individuals. Demand for goods and services declined, many physical stores closed and supply chains were disrupted. Because of all this, many businesses have had decreased revenues from 2020 onwards.

In addition to random events like pandemics, some businesses simply do not have enough information to make sales forecasts. New businesses, for example, have to use other methods to forecast sales. In general, however, all businesses must use a variety of tools to make forecasts. In addition to quantitative sales forecasting, businesses should use market research and a variety of tools like the product life cycle (Section 4.5.1 (/study/app/y12-business-management-a-hl-may-2024/sid-351-cid-174702/book/product-life-cycle-id-39005)), the BCG matrix (Section 4.1.6 (/study/app/y12-business-management-a-hl-may-2024/sid-351-cid-174702/book/tool-bcg-matrix-id-37441)), STEEPLE analysis (Section 1.1.6 (/study/app/y12-business-management-a-hl-may-2024/sid-351-cid-174702/book/tool-business-plan-id-36505)) and others to help make decisions about the marketing mix. **Table 1** captures the uses and limitations of sales forecasting.

**Table 1.** The uses and limitations of sales forecasting.

| Uses of sales forecasting | Limitations of sales forecasting |
| --- | --- |

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| --- | --- |
| **Based on past data.** The forecast is based on past sales data, which should add some validity to the results.<br><br>**Effective future planning.** If correct, forecasts can help companies to plan for the future. New equipment, staff and inventories can be secured to meet increased demand.<br><br>**Increase budgets to increase sales.** If a drop in sales is forecast, companies can react to this with increased marketing budgets, in an effort to increase sales.<br><br>**Better ability to decide.** If forecasts are extremely negative, a company may decide to withdraw a product from the market before it becomes a drain on resources. | **Not enough data.** New companies do not have previous data upon which to draw.<br><br>**Changing markets.** Rapidly changing markets can lead forecasts to be invalid.<br><br>**Flexibility.** Forecasts should only be seen as a guide. Managers need to remain flexible rather than following plans blindly.<br><br>**Use of different methods to predict.** Sales forecasting is just one method of predicting future sales. Companies should also be mindful of market research results and product life cycle analysis. |

## Exam tip

When they appear in examinations, sales forecasting questions often come in one of two formats. One type of question will ask you to analyse and/or graph data to make a sales forecast. You may need to graph data, draw a line of best fit and extrapolate. Another type of question may ask you to evaluate the uses and limitations of sales forecasting.