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2.3 Using sales forecasts

2.3.1 Purpose of sales forecasting

Accurate sales forecasting is important to a business as it allows the business to efficiently allocate resources for future growth and manage its cash flow. Sales forecasting involves projecting future demand through the anticipation of consumer behaviour in specific circumstances. Businesses may enquire about the potential impact on demand with scenarios such as a 10% increase in real incomes or the introduction of a competitor's copycat product.

Sales forecasting techniques allow businesses to predict sales. Once a business has what it believes is an accurate estimate of future sales it can then predict HRM and finance needs, estimate the quantity and cost of purchases of raw materials as well as determine production levels. Sales forecasting methods can be categorised into quantitative and qualitative techniques. Quantitative forecasting methods are used when there is historical data available. A number of different models can be used to forecast future events and predict likely revenue. Quantitative methods rely heavily on data and are objective. These methods include:

- time series analysis
- use of market research data.

Using past experience or past business data to forecast future sales is called extrapolation. Extrapolation involves making statistical forecasts by using historical trends that are projected for a specified period of time into the future. It is only used for time series forecasts.

Qualitative forecasting methods are used when historical data is not available to carry out quantitative methods. Qualitative methods involve the use of opinions to predict future events and are subjective. These methods include:

- the Delphi method
- brainstorming
- intuition
- sales force opinions
- expert opinions.

Sales forecasting and its role and value in planning business activity

Sales forecasting plays a crucial role in business planning by involving the estimation of the future. It can help to guide various aspects of business activity and decision making. Below are some of the main reasons why sales forecasting is useful to a business:

- **Setting appropriate staffing levels**: The management of a business could plan the workforce using sales forecasting to ensure that there are suitable levels of staff to cater for the needs and wants of customers. If this is not planned correctly a business could either waste resources or may not be able to provide the level of goods or the service required to satisfy customers.
- **Determining a sales budget**: Accurate sales forecasting is vital for budgeting purposes. Sales forecasting sets the sales budget and helps businesses allocate resources to marketing to ensure that the sales budget is met.
- **Informing future sales tactics**: Sales forecasting serves as a roadmap for future sales by providing data driven estimates of expected revenue based on historical trends, market analysis and internal factors. A business can analyse these forecasts to strategically set realistic sales targets for the future and create marketing tactics to capitalise on identified opportunities.
- **Identifying trends from given data**: Sales forecasting allows a business and its management to identify trends and patterns in customer behaviour, market conditions and sales cycles. This can help in adjusting sales strategies to capitalise on opportunities or mitigate challenges within a business environment, such as increasing competition.
- **Contributing to target setting**: Sales forecasting can be used by a business and its management team to set realistic and achievable sales goals for the future. A business can establish clear targets based on historical data and market trends. These goals or targets can motivate marketing and sales staff and enable the business to achieve the overall sales targets.

Overall, sales forecasting is a fundamental tool that guides a wide range of business activities. It enables businesses to plan strategically, allocate resources effectively and make informed decisions.

Student activity

1. **State whether each of the following statements about the purpose of sales forecasting is true or false:**

Statement	True or False
Sales forecasting involves predicting future demand solely based on historical data without considering external factors or market changes.	
A business can use sales forecasting to predict HRM and finance needs, estimate raw material purchases and determine production levels.	
Extrapolation is a qualitative forecasting method used when historical data is not available for time series forecasts.	
Qualitative forecasting methods are utilised when historical data is not available and involves the use of subjective opinions to predict future events.	
Sales forecasting plays a crucial role in business planning, such as setting appropriate staffing levels based on historical data and market trends.	
Setting realistic and achievable sales goals based on historical data and market trends is one of the ways in which sales forecasting contributes to target setting.	
Quantitative forecasting methods, such as time series analysis, are subjective and rely heavily on opinions rather than objective historical data.	

2.3.2 Methods of sales forecasting

Understanding and using sales forecasting methods

As stated previously, there are two methods of sales forecasting that a business could use to predict future sales revenue and make decisions based on the data: qualitative sales forecasting methods and quantitative sales forecasting methods.

Qualitative sales forecasting methods

Qualitative forecasting methods are used when historical data is not available to carry out quantitative methods. Qualitative methods involve the use of opinions to predict future events and are subjective.

The Delphi method

The Delphi method is a forecasting technique which is based on researching the views of a panel of experts.

The main **benefits** of the **Delphi method** are that:

- ☑ It is flexible enough to be used in a variety of situations and can be applied to a range of complex problems.
- ☑ It provides a structured way for a group of people to make decisions. The Delphi method begins with the initial development of a questionnaire focusing on the problem. The panel of experts answer the questionnaire independently and then independently rate and prioritise ideas in a second questionnaire devised from their initial responses. From this, the group of experts should arrive at a consensus forecast on the subject being discussed.
- ☑ Participants have time to think through their ideas, which leads to a better quality of response and better and more informed decisions about the future.
- ☑ The Delphi method creates a record of the expert group's responses and ideas, which can be used when needed for future problems or issues.

The main **limitations** of the **Delphi method** are that:

- ☒ The method will more than likely require a substantial period of time to complete, as the process is time-consuming to co-ordinate and manage. Decisions could be made more quickly using quantitative forecasting or computerised forecasts.
- ☒ It assumes that experts are willing to come to a consensus and allow their opinions to be altered by the views of other experts.
- ☒ Monetary payments to the experts may lead to bias in the results of the study.

Intuition

Intuition is used when it is difficult to predict the future because products are new to the market. It is difficult to predict in this situation because there may be very little historical data available. Another example of when sales are difficult to predict is when the market a business operates in is unstable and is constantly changing. Therefore, with limited data available to collect and examine, business leaders and managers may instead use their 'gut feeling' or intuition. They may have experience of other existing markets and products that can be transferred to new markets and products.

It is often said that successful entrepreneurs have good intuition. Steve Jobs, founder of Apple, used intuition on more than one occasion to launch successful products. He believed that intuition was 'more powerful than intellect'. Intuition is sometimes referred to as 'Genius Forecasting', which combines intuition, insight and luck.

The main **benefits** of **intuition** are that:

- ☑ It is useful when there is very little historical data available for new markets or if the market a business operates in is unstable and is constantly changing. Therefore, managers may have experience of other existing markets and products that can be transferred to new markets and products.
- ☑ The use of intuition is cheap, and fast. There is no need for data gathering, market testing and so on.

The main **limitations** of **intuition** are that:

- ☒ Gut feeling and experience should not be the only guidance. There are many examples of experienced entrepreneurs and business managers who have lost a lot of money due to their intuitive decision making.

Brainstorming

Brainstorming involves a collaborative and creative process in which a group of individuals, typically sales and marketing employees, work together to create ideas and insights regarding future sales trends, opportunities and risks. The aim is to utilise collective knowledge and experiences to make more accurate predictions about future sales performance. Throughout a sales forecasting brainstorming session, individuals may discuss various factors that could impact sales, such as market trends, customer behaviour, economic conditions, industry changes and competitive environments.

The main **benefits** of **brainstorming** are that:

- ☑ It brings together individuals with diverse backgrounds, experiences and opinions. This may lead to a wide range of creative ideas and insights that may not have been considered. It can also improve problem solving and generate innovative ideas to improve sales.
- ☑ It fosters a collaborative and open environment where team members can freely share their thoughts and opinions. This may strengthen team cohesion and communication, which can lead to improvements in overall teamwork and productivity.

The main **limitations** of **barnstorming** are that:

- ☒ It can stifle opinions and lead to a loss of individual creativity, resulting in a less diverse range of ideas.
- ☒ It may lead to unequal participation because some individuals may be more vocal and assertive, while others may be hesitant to share their ideas. This can lead to a situation where ideas are not fully explored, limiting the overall effectiveness of the brainstorming process.

Expert opinions

Expert opinions in sales forecasting involves the use of insights and predictions provided by individuals who possess high levels of knowledge, experience and expertise in a particular industry or market.

The main **benefits** of **expert opinions** are that:

- ☑ Experts may have a detailed understanding of the industry, market trends and the factors that can impact sales. Their views and opinions can provide a qualitative understanding of the market dynamics that might not be fully gathered by quantitative data.
- ☑ Experienced professionals in sales and marketing develop an intuitive understanding of customer behaviour, competitive environments and other relevant factors. This can be vital in making informed predictions about future sales trends.

The main **limitations** of **expert opinions** are that:

- ☒ Expert opinions can be subjective and influenced by personal bias. Different experts may offer varying opinions based on their unique experiences, leading to potential differences in forecasting.
- ☒ Expert opinions may not always result in accurate quantitative predictions. The complex nature of markets and the variety of influencing factors can make it challenging to rely solely on expert judgment for precise forecasting.

Sales force opinion

This consists of the opinions of those individuals that contribute to the selling of a product, be it in-person, via telemarketing or online via website chat panes. They are the eyes and ears of a business, given their direct interaction with customers in the market.

Sales teams within businesses interact closely with customers. Sales staff might notice any developing trends, and they have the experience to spot market changes and shifts in customer preferences and attitudes. This direct sales information can be collected by management requesting statistical predictions of future sales, and by encouraging the upward flow of information through their organisation.

Quantitative sales forecasting methods

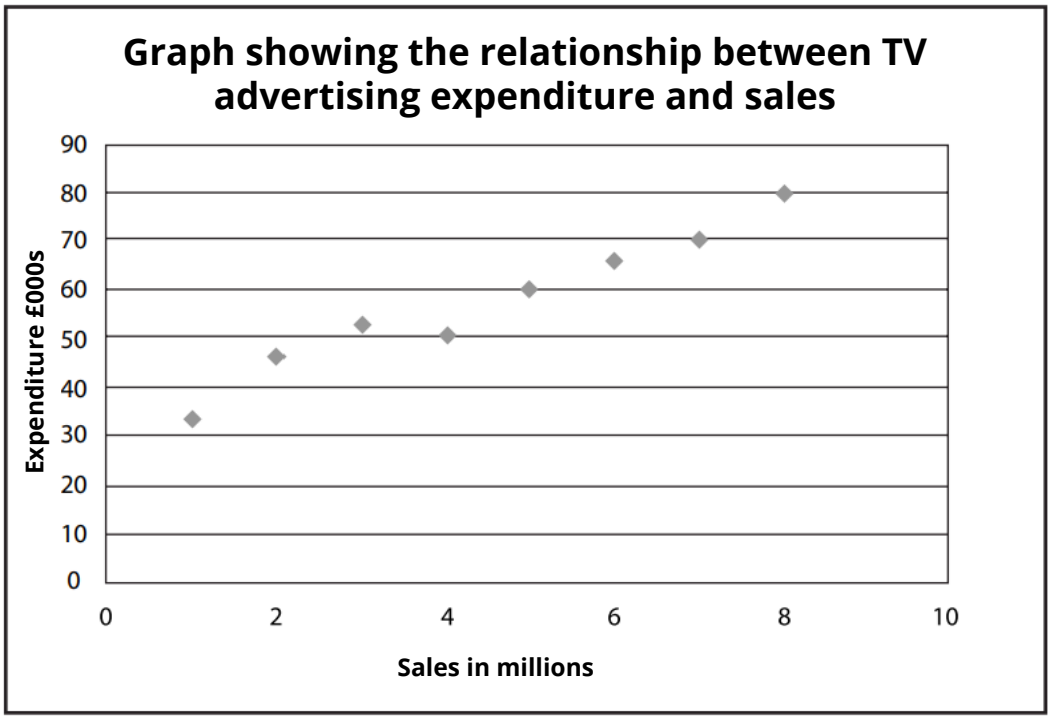
Quantitative forecasting methods are used when there is historical data available. A number of different models can be used to forecast future events. Quantitative methods rely heavily on data and are objective. One way in which quantitative sales forecasting can be used is through time series analysis. Time series analysis is a method used for quantitative sales forecasting which involves the use of evidence from past sales records to predict future sales patterns. There are several methods of time series analysis that can be used:

- **Seasonal analysis**: Sales are measured on a monthly or weekly basis to examine the seasonality of demand. For example, the sales of ice cream will be higher in the warmer seasons and lower in the colder seasons or according to daily weather changes.
- **Trend analysis**: This focuses on long-term data, which has been collected over a number of years. The objective is to determine the general tendency of sales – rising, falling or stagnant.
- **Cycle analysis**: As with trend analysis, long-term figures are used but the objective now is to examine the relationship between demand levels and economic activity, for example by asking the question '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 cream 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 sales activity.

Trend analysis and extrapolation

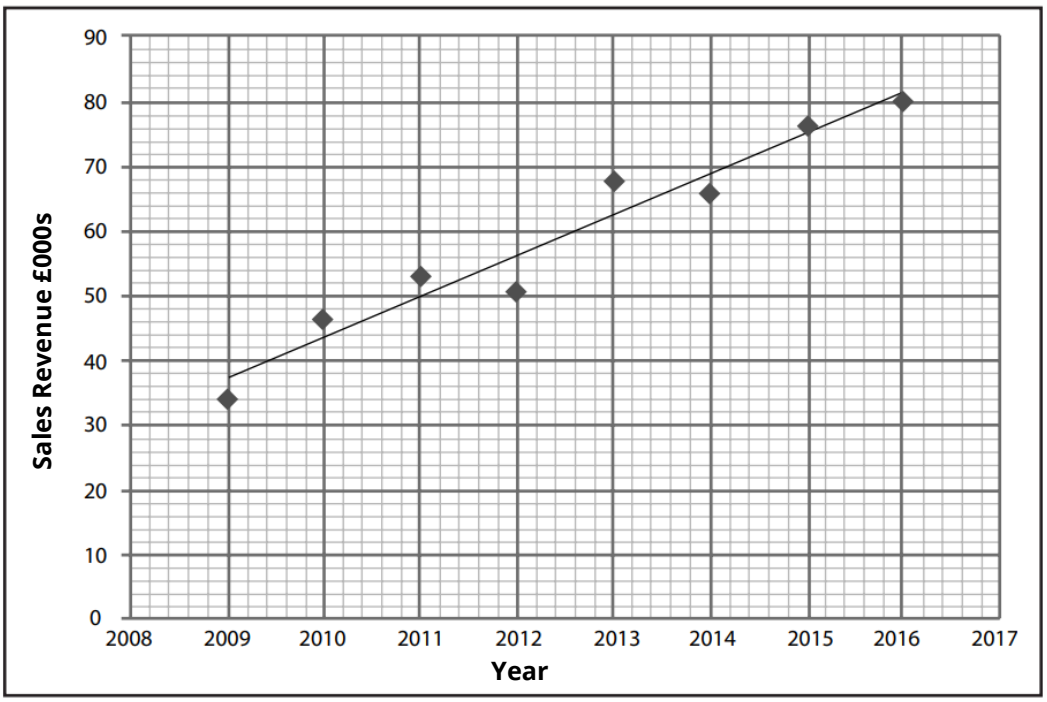
Trend analysis is a statistical method that involves using historical data over time to identify patterns and trends, providing information for decision making. Trend analysis is vital for forecasting, planning and adapting to changes in various dynamic environments. When using historical data it is important for managers to look at correlation. A correlation measures the relationship between two variables, for example whether there is a link between advertising expenditure and the amount of sales a business achieves. The data of the two variables are plotted on a scatter graph.

Below is a scatter graph showing the amount spent on TV advertising for a product and the sales for that product:

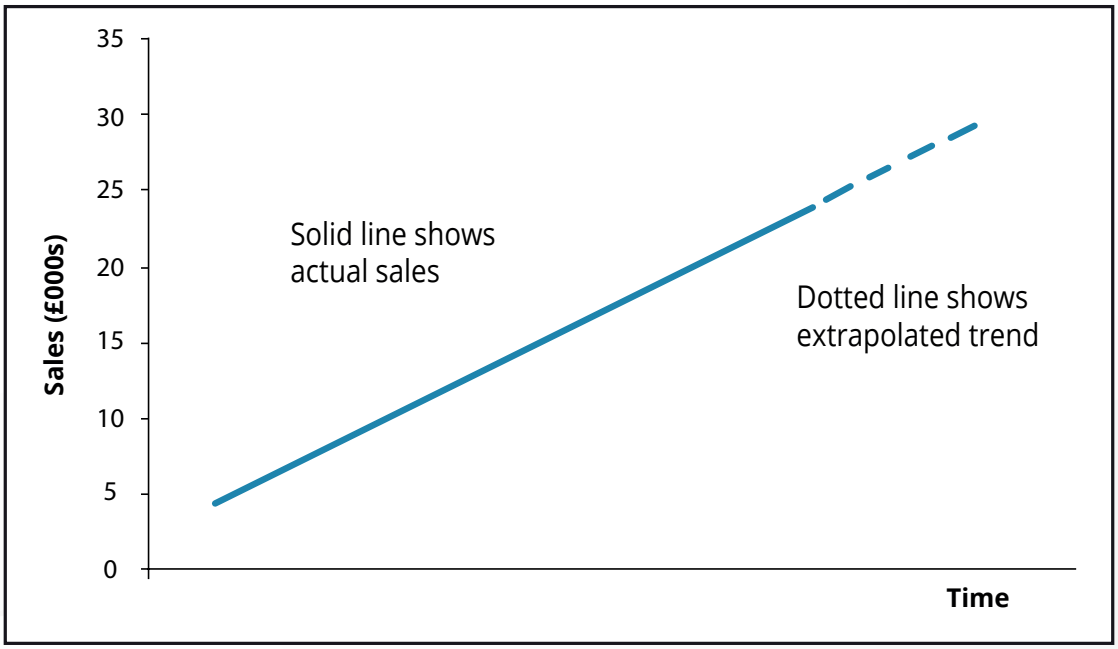


We can see a clear relationship between the two variables. This is because the scatter graph shows that as the expenditure of TV advertising increases so does the sales of the product they advertise. In this example, there is a strong positive correlation between the two variables.

In order to gain a clearer picture of the data and to extrapolate, a line of best fit can be drawn on the scatter graph. This is a line that, as best as possible, should run through the middle of all of the data points on the graph. In this way, the points are evenly distributed on each side of the drawn line, as shown in the graph below.



Based on the historical data and the line of best fit, a business can extrapolate the sales graph to show the future sales displayed as a dotted line, as shown in the graph below:



Moving averages

A moving average in sales forecasting is a statistical method used to analyse and smooth fluctuations in time series data, such as sales figures, over a specified period. It is a technique to identify trends and patterns within the data by reducing the impact of short-term fluctuations.

A moving average is calculated by taking the average of a set of data points within a defined space or time span. The 'moving' part refers to the fact that this space is shifted through the data set one step at a time, and a new average is calculated for each position.

Below is an example of a set of sales data for Daisy's Dresses Ltd, which is a manufacturer and retailer of clothing for women:

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Sales revenue (£000s)	56	66	79	110	129	154	173	189	202	215

These figures show that there is variation in the number of clothing sales depending on the year. To establish a trend in the number of clothing sales, a three-point moving average can be calculated (in this case a three-year moving average).

To calculate the three-year moving average, just take three adjacent figures for each year and divide by three. So for 2017:

The total for the three years of clothing sales is £56 + £66 + £79 = £201. Divide this by 3 which equals £67 or £67 000.

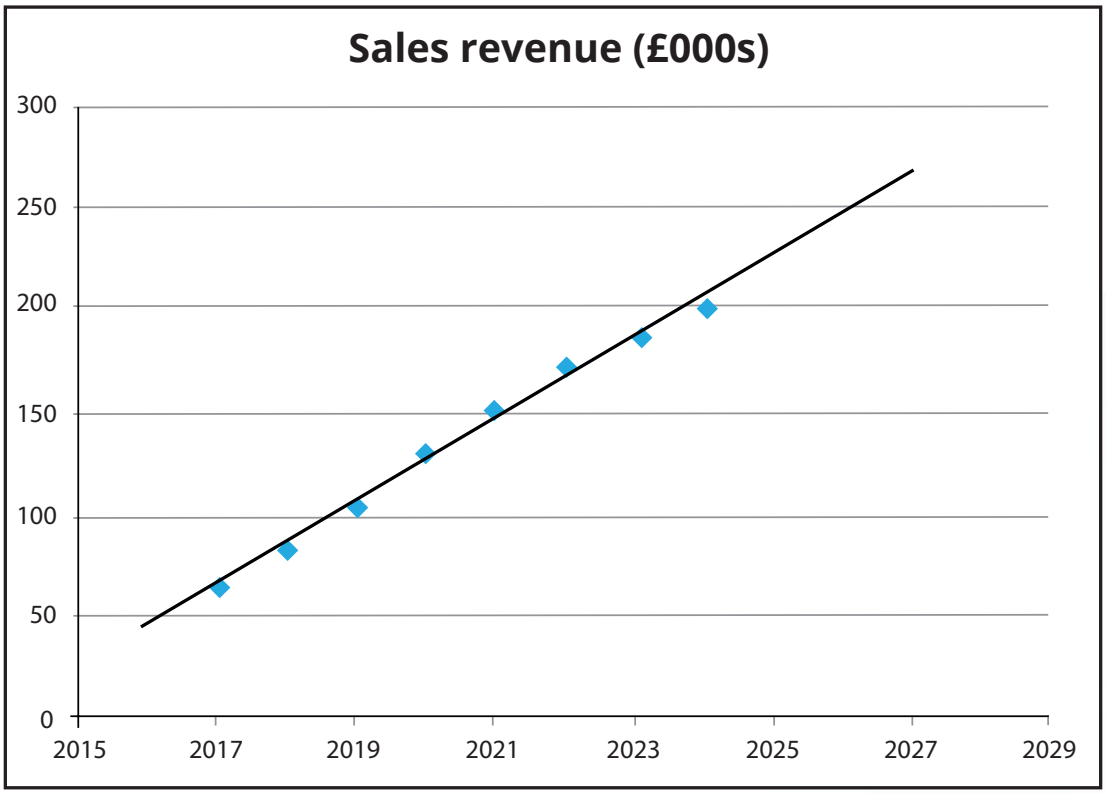
Year	2016	2017	2018
Sales revenue (£000s)	56	66	79
Three-year moving average (£000s)	-	**67**	

Once the first three-point moving average has been calculated, it is then possible to calculate the remaining three-point moving averages. For example, for 2018, we now ignore 2016 and add the next three years of sales revenue: 2017, 2018 and 2019. The total for these three years of clothing sales is £66 + £79 + £110 = £255. Divide this by 3 which equals £85 or £85 000.

The process is continued so the next set of data will be a three-point moving average of 2018 + 2019 + 2020 divided by 3. The table below is completed:

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Sales revenue (£000s)	56	66	79	110	129	154	173	189	202	215
Three-year moving average (£000s)	-	67	85	106	131	152	172	188	202	-

If we plot all the data for all of the moving averages using the data in the table above, fluctuations are smoothed out so that a trend can be easily identified. This is illustrated in the graph below:



As can be seen on the graph, a line of best fit can be used to help predict future sales revenue by simply extending this line in order to forecast future figures – extrapolation. Sales revenue for 2027 can be predicted to be approximately £260 000.

2.3.3 Limits on sales forecasting

One of the main limitations of sales forecasting is that historical data is not always a good indication of what might happen in the future – trends may change. There are several other limitations of sales forecasting, and the reasons why differences arise between actual and forecast sales. These include:

- **Growth or decline in the market**: Markets are dynamic and can change quickly. These changes are driven by economic factors, technological advancements, consumer preferences and unforeseen events. The dynamic nature of markets makes it challenging to accurately predict the future sales, especially over longer periods of time. For example, demand for products or services can quickly decline because fashion and trends change.
- **Changes in the economic environment**: The economy is volatile and changes to employment levels, interest rates, taxation and inflation can impact on the demand for goods and services. For example, if interest rates rise, consumers may have less money to spend and will therefore reduce consumption of certain goods and services. This makes sales forecasting unpredictable.
- **Advances in technology**: New technologies, such as artificial intelligence and data analytics can help businesses make more accurate predictions by analysing large amounts of information. This can be beneficial for understanding customer trends and market changes. However, innovations may quickly change how people buy products or introduce new competitors, making it difficult to predict future sales with a high degree of accuracy.
- **Changes in product portfolio**: Launching new products or discontinuing existing ones can change customer demand patterns and market dynamics. When launching new products, sales forecasting needs to consider factors such as market acceptance and consumer preferences. On the other hand, discontinuing products requires accurate estimates of how quickly sales for those items will decline. The timing and success of product launches, as well as adaptations in inventory and marketing strategies, are essential for reliable sales forecasts.
- **Competitor activity**: Increased/reduced competition may impact on the sales revenue of a business, such as a women's clothing retailer. For example, if new competitors entered the market, customers might switch from one business to the other depending on price and quality. Competitors may reduce prices to increase sales and market share, therefore one business would lose customers and, as a result, sales forecasting would be inaccurate.
- **Level of promotional activity**: Promotions such as discounts, advertising campaigns or special offers can impact consumer purchasing behaviour and overall demand for goods and services. High levels of promotion may lead to temporary peaks in sales, making accurate forecasting difficult without considering these promotional effects. On the other hand, reduced promotional activity might result in lower-than-expected sales. Therefore, forecasting models need to incorporate information about planned promotions, their timing and their potential impact on customer behaviour.

- **Human and physical resources available**: Limited or insufficient resources, such as a shortage of skilled sales employees, production capacity issues or logistical problems, can negatively affect a business's ability to meet forecasted demand, even if the market is growing. Alternatively, an overestimation of available resources may lead to excess inventory or operational inefficiencies.

Student activity

1. **Extended questions**

   Using the information you have learned, answer the following questions:

   i. Outline the difference between qualitative and quantitative data.
   ii. Describe what is meant by a moving average.
   iii. Explain **one** reason why businesses calculate moving averages.
   iv. How is a three-year moving average calculated?
   v. State what is meant by extrapolation.
   vi. Suggest and explain **two** benefits and **two** limitations of sales forecasting.

2. **Examination question**

   JK Lessing Ltd manufactures garden ornaments. The company's sales revenue for the last ten years is given in the table below.

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Sales revenue (£000s)	215	225	250	362	261	340	332	381	280	422

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Sales revenue (£000s)	215	225	250	362	261	340	332	381	280	422
Three-year moving average (£000s)	-	-	-	-	-	-	-	-	-	-

i. Calculate a three-year moving average of the company's sales revenue, writing your answers in the table provided.

ii. Plot your answers on the graph provided and draw in a line of best fit.

iii. Use the line of best fit to predict the sales revenue for 2026.

iv. Assess the usefulness of this prediction to the company.

v. Evaluate the usefulness of qualitative sales forecasting techniques, such as the Delphi method and expert opinions.