TOPIC 7
THE BUSINESS MANAGEMENT TOOLKIT

SUBTOPIC 7.1
THE BUSINESS MANAGEMENT TOOLKIT

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SWOT is a simple tool for a business to analyse its internal strengths and weaknesses, and external opportunities and threats. A SWOT analysis can help a business understand its current position and identify strategies to improve the business.

Managers should conduct a SWOT analysis frequently. Businesses must understand and respond to the constant changes in the conditions they face.

Concept

Change

Change is an act or process through which something becomes different. Businesses operate in a world with constant change.

Understanding change involves researching and responding to signals (feedback) in the external environment. Businesses need to adapt their goals and actions to respond successfully to internal and external changes.

Click on the hotspots in **Figure 1** to see an overview of things businesses should consider when conducting a SWOT analysis.

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Figure 1. SWOT matrix.

More information for figure 1

The interactive SWOT analysis tool is structured into four distinct quadrants. Each quadrant represents the following key factors: strengths, weaknesses, opportunities, and threats. The layout categorizes factors as internal or external. Strengths and weaknesses fall under internal factors, while opportunities and threats are classified as external influences.

On the left side of the interface, two plus symbols are positioned next to Internal factors and External factors. Clicking on these icons reveals informational pop-ups that guide users in analyzing relevant aspects. The internal factors pop-up prompts users to evaluate business performance based on four key functions: human resources, marketing, finance and accounts, and operations. Meanwhile, the external factors pop-up introduce the STEEPLE framework, which considers sociocultural, technological, economic, environmental, political, legal, and ethical influences on a business.

To enhance clarity and usability, the interface employs a color-coded system: blue for strengths, orange for weaknesses, green for opportunities, and pink for threats. Each quadrant prominently features a large letter (S, W, O, or T) at its center, reinforcing the visual organization of the analysis. This interactive design enables users to systematically assess and categorize internal and external factors that impact business strategy and decision-making.

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Internal factors: strengths and weaknesses

Every organisation is unique. There are many strengths and weaknesses that could be included in a SWOT analysis. One way to organise your thinking is to consider the internal strengths and weaknesses of a business in the categories of the main business functions or processes that you learned about in Section 1.1.1 (/study/app/business-hl/sid-351-cid-762729/book/the-nature-and-role-of-business-id-36498/). These functions or processes are listed in **Table 1**. They are a framework for you to think through case studies.

Table 1. Some examples of internal strengths and weaknesses organised by business function/process.

Business function	Example strengths	Example weaknesses
Human resources	Highly trained, skilled and educated staff; loyal, collaborative employees.	Poor management; unskilled, unqualified or unmotivated employees; conflict between employees.
Finance	Enough money for running and expanding the business; good relations with banks; strong growth of sales and profits.	Lack of money for running and expanding the business; declining revenues and profitability.
Marketing	Strong brands; loyal customers; unique products or services.	Low brand awareness and brand loyalty; products similar to those of competitors.
Operations	Modern facilities; efficient, low-cost production; high-quality products.	Outdated facilities; inefficient, high-cost production; poor quality products.

External factors: opportunities and threats

External opportunities and threats refer to factors that are outside the organisation that it cannot control. Usually, external factors will be the same for a business and its competitors in the same industry and location.

An opportunity is any favourable external condition or trend that is beneficial for the business. For example, an opportunity for a business could be cultural changes that increase demand for a business's product.

A threat is any unfavourable external condition or trend that harms the business. For example, international climate agreements that require countries to reduce CO_2 emissions are a threat to oil companies who cannot change their business quickly.

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Exam tip

The word 'opportunities' in SWOT is used differently than you may be used to.

Here you are not discussing strategies for the business like 'the business has an opportunity to develop a new product.' In the SWOT analysis, an opportunity refers to an external condition or situation that is favourable for the business.

As with the internal factors in the SWOT framework, it is helpful to have a framework to consider the external factors that can affect a business. The STEEPLE framework provides a useful way to remember factors to consider in your analysis. It stands for the following factors, which will be explained in more detail below:

- Sociocultural
- Technological
- Economic
- Environmental
- Political
- Legal
- Ethical

These factors can affect markets for particular goods. They can reveal opportunities for businesses to provide for human needs. The factors can also be threats to a business if they negatively affect the demand for the products the business makes.

Click on the hotspots in **Figure 2** to see an overview of each of the STEEPLE factors.

Figure 2. Steeple factors.

More information for figure 2

Student view

An interactive visual represents the STEEPLE framework, which includes sociocultural, technological, economic, environmental, political, legal, and ethical factors. Each factor is displayed as a distinct colored block with its corresponding initial letter. Within each block, there is a plus symbol that serves as a hotspot. By clicking the hotspots, pop-up texts providing details about the specific factor appear. The interface is designed to help users explore different external influences on businesses and organizations.

Hotspot 1 in the sociocultural factors read, All the social or cultural characteristics that affect the market for a product or the operations of a business. This could include the age structure of the population or the dominant religion.

Hotspot 2 in the Technological factors read, The state of technology and infrastructure in a country or industry.

Hotspot 3 in the Economic factors read, Factors such as inflation, unemployment levels and the level and growth of incomes in the population.

Hotspot 4 in the Environmental factors read, Everything related to planetary boundaries (such as water, land, biodiversity, climate change) and the availability of natural resources for the business.

Hotspot 5 in the Political factors read, The state of the political systems in the country, including the stability of the government, who is in power and what their interests are.

Hotspot 6 in the Legal factors read, All laws that might affect the business. These could include labour laws, regulations on business processes and environmental protections.

Hotspot 7 in the Ethical factors read, Business behaviours that are considered to be ‘good’ or ‘bad’ in the national or global context.

This interactive enables students to develop a comprehensive understanding of the STEEPLE framework by exploring the key external factors that influence businesses and organizations. By engaging with the hotspots, students gain insight into how sociocultural, technological, economic, environmental, political, legal, and ethical elements impact decision-making, market dynamics, and business operations.

Sociocultural factors

Sociocultural factors are all the social and cultural characteristics of a region or country. These can include factors like the age structure (demographics) of the population. They can also include the way people live, like the health status and education of the population. Beliefs and values are also part of sociocultural factors. These factors will affect what people choose to buy and how they spend their time.

Businesses need to be aware of current and changing sociocultural conditions, so they can create products and solutions needed by people. Businesses also need to recognise when changing sociocultural factors threaten their business.

Activity

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Learner profile: Inquirer
Approaches to learning: Research skills (information literacy); Thinking skills (transfer)

Examine the choropleth map below which shows the median age by country. The age structure of a country can affect the demand for the products of a business.

The year for the map is set at 2025, but you can change the year to see past data or future estimates.

Hover over individual countries to see the median age in the year 2025.

Figure 3. Median age by country, 2025.

Questions

1. Identify a country with a median age above 50 years in 2025. State the country and its median age. [2 marks]
2. Explain why a business might consider the demographics of the country you identified in Question 1 as an external threat. [2 marks]
3. Identify a country with a median age between 14 and 20. State the country and its median age. [2 marks]
4. Explain why a business might consider the demographics of the country you identified in Question 3 as an external opportunity. [2 marks]

Note: these questions use exam command terms. A brief explanation of each command term is included in the answers below.

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Question 1

Japan — median age in 2025 of 50.2 years.

Identify is an AO1 level command term, requiring an answer from a number of possibilities.

- To achieve full marks, the response should name a country and the median age using the data from the choropleth map.

Question 2

Japan's high median age could be a sociocultural threat to a business. If a business is aiming to sell its product to a younger group, it might see weak demand for its product. For example, if a business in Japan produced baby clothes, it might find that the demand for its goods is weaker than it would like, because there are so many older people who have no need for baby clothes.

Explain is an AO2 level command term, requiring a detailed account including reasons or causes. Explain *why*, explain *how*.

- One mark is given for explaining that a business producing goods or services for a younger demographic may see weak demand.
- One mark is given for providing an example to support the idea.
- You may explain the issue differently or use a different example and still be awarded marks if the response is appropriate.

Question 3

Niger — median age in 2025 of 15.3 years.

Identify is an AO1 level command term, requiring an answer from a number of possibilities.

- A different country could be identified as long as the median age is between 14 and 20 years.
- To achieve full marks, the response should name a country and the median age using the data from the choropleth map.

Question 4

Niger's (or some other appropriate country) low median age could be a sociocultural opportunity for a business. If a business wanted to sell its product to a younger group, it could see strong demand for its product in Niger. For example, if a business in Niger was providing education for younger students, there may be high demand for its services.

Explain is an AO2 level command term, requiring a detailed account including reasons or causes. Explain why, explain how.

- One mark is given for explaining that a business producing goods or services for a younger demographic may see strong demand and/or high revenues.
- One mark is given for providing an example to support the idea.

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- Students may explain the issue differently, or use a different example and still be awarded marks if the response is appropriate.

Technological factors

The state of current technology will affect what products a business offers its customers. Technology will also affect how a business operates. Businesses are constantly offering new products based on new technologies. Some of these products improve human wellbeing, like the development of COVID-19 vaccines using new mRNA technologies. Other products based on new or updated technologies may be less useful. These new technologies may be put into products by businesses to increase the chances that a customer buys a new product, even if they already own a product that is useful. For example, many new smartphones add new technology that adds little new value to the previous version. This is just to get customers to spend money again on a personal need that is already filled.

Businesses can also improve their production methods by using new technologies. For example, 3D printing is a technological change that makes producing some goods faster and easier. We will examine technological changes for business in **Subtopic 5.9**.

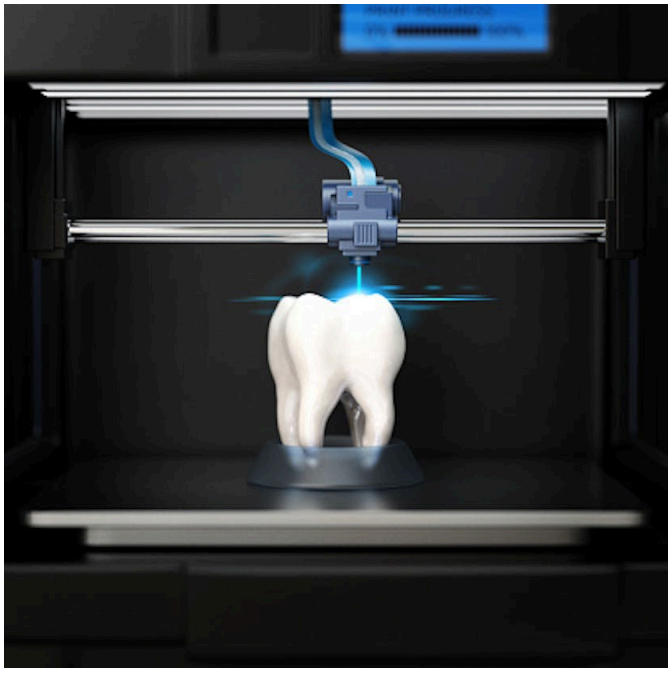

Figure 4. The impact of 3D printing on business is just beginning.

Credit: Maciej Frolow, Getty Images

Student view

The technological factor in STEEPLE also includes a country's infrastructure. Infrastructure includes all the large-scale goods in an economy that make business possible. Infrastructure includes things like ports, road and railway networks, drinking water, communication and

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electricity systems. When these systems are well developed, they are opportunities for businesses. However, poor infrastructure can be a threat to businesses because they will not be able to produce and distribute their products very efficiently.

Economic factors

Countries and regions have different economic conditions that will affect the demand for goods and services. For example, as incomes increase, demand for goods and services will increase. This is an opportunity for businesses. However, rising incomes also cause consumers to demand different kinds of products. These changing economic conditions will be an opportunity for some businesses and a threat to others.

There are cycles of gross domestic product (GDP) growth and decline. When GDP is growing, there is an expansion in the economy. A recession is when the GDP declines for a period of time, usually six months or more.

These cycles of expansion and recession are called the business cycle. The business cycle can have an impact on demand and business activity. During periods when the gross domestic product is growing, incomes will probably rise in the population and people will have more jobs. As a result, businesses may see increased demand for their products.

During recessions, when the overall value of everything that is produced declines, businesses may see weaker demand because of falling incomes and higher unemployment. Businesses need to be aware of these income changes to respond to the changing needs and wants of consumers.

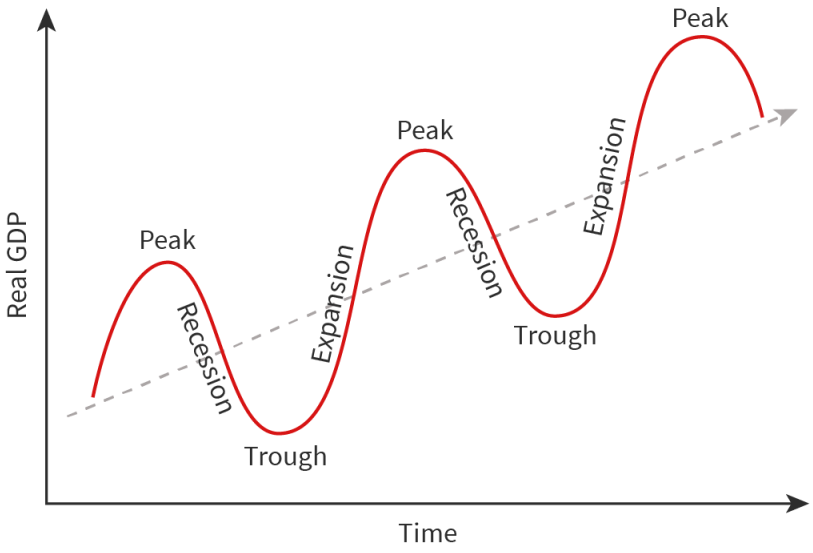

Figure 5. The business cycle involves times of expansion and recession that can affect demand for the products of a business.

More information for figure 5

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The image is a graph illustrating the business cycle. The X-axis represents 'Time' and the Y-axis represents 'Real GDP'. The graph shows a cyclical pattern with a red line indicating various phases.

1. Peak: The graph reaches a high point, labeled as 'Peak'.
2. Recession: Follows after a peak, indicated by a downward slope.
3. Trough: The graph reaches its lowest point, labeled as 'Trough'.
4. Expansion: Follows a trough, indicated by an upward slope.

This pattern repeats, indicating the cyclical nature of economies with peaks, recessions, troughs, and expansion phases. The dotted line suggests the general upward trend over time.

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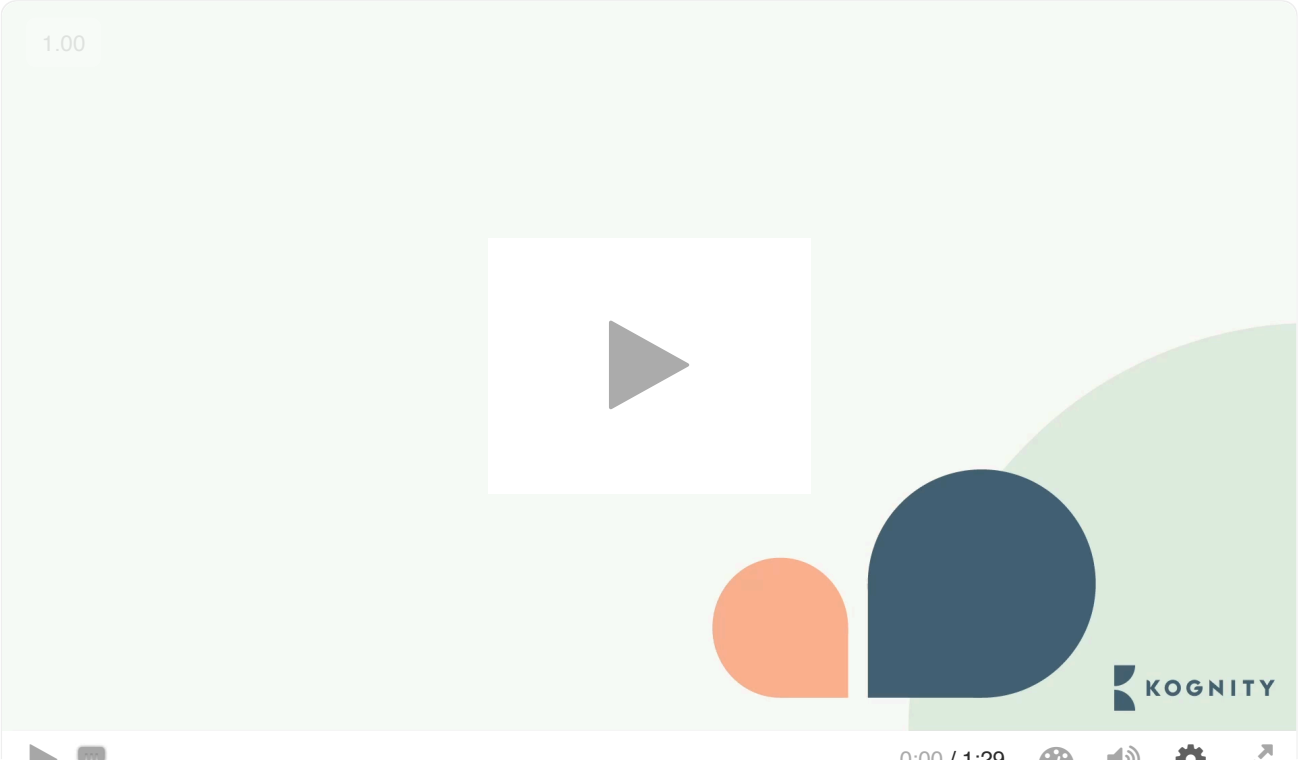
Watch the video below to understand more about the business cycle.



Video 1. Exploring key phases and dynamics of the business cycle.

More information for video 1

Like rollercoasters, economies go up and down. The movement of economies over time is called the business cycle, which has four phases: growth, boom, recession, and slump. The business cycle illustrates the change in a country's gross domestic product over time. When a country's economy is growing, its output increases as more goods and services are produced. This in turn increases its GDP. This then increases demand for inputs such as labor and capital. However, when supply is limited, costs increase and prices go up, so customers buy less. When this happens, production falls, demand for inputs decreases,

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and countries' GDP and economies contract. Business cycles are affected by many different factors, not the least of which are global crises such as the COVID-19 pandemic. Governments implement a variety of economic policies to stop the business cycle from fluctuating too greatly and to prevent economies from slowing down. Because no one wants a bumpy ride.

Exam tip

You are not expected to define macroeconomic terminology in this course. However, you may see the terms below in case studies, so you need to know what they mean.

Gross domestic product (GDP) — the total monetary value of all final goods and services produced in an economy in a given period of time; represents the size of the economy

GDP per capita — divides total GDP by the population of a country

Expansion — when the total value of all goods and services produced within the borders of a country (GDP) is increasing

Recession — when the total value of all goods and services produced within the borders of a country is decreasing, usually for six or more months

Inflation — an increase in the general price level, usually expressed as percentage change

Deflation — a decrease in the general price level, usually expressed as percentage change

Interest rate — the cost of borrowing money; important for businesses because they may need to borrow money for business investments

Unemployment rate — the percentage of the labour force that is out of work but actively seeking employment at a given time

Import — goods brought into a country

Export — goods manufactured in a country and sold abroad

Exchange rate — the price of one country's currency in terms of another country's currency

Subsidy — government payment to businesses

Tax — payment from individuals or businesses to government

Environmental factors

Environment in the STEEPLE analysis refers to the natural environment. Many businesses rely on natural resources as inputs and changes in the natural environment can have a large impact on businesses. For example, a drought or severe storms may affect a farmer's ability to grow crops. Other industries that use water to produce their goods will also be affected like producers of paper, food processors, power producers, and clothing manufacturers.

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Climate change is impacting businesses worldwide. Changing weather patterns, increased frequency of storms, floods, forest fires and droughts can all affect businesses. International climate change agreements like the Paris Agreement in 2015 will force businesses to reduce CO_2 emissions. These changes will create opportunities for some businesses, like renewable energy firms. However, these changes are a threat to other businesses, like those producing oil and mining coal.

Many countries are trying to protect biodiversity and respect planetary boundaries. These efforts may make it harder for businesses to get the resources they need to produce their products and may be a threat. Other businesses, like those in the cosmetics and pharmaceutical industries, see biodiversity as a potential source of resources for medical advances. The efforts to protect biodiversity and respect nature can be opportunities for those businesses.

Businesses also need to consider their waste production and air pollution. Many industries use plastics to package their goods but plastic waste dumped into the environment is a growing problem. All businesses are now exploring new forms and materials for packaging and ways to reduce plastic to address this problem.

Circular business models, which will be explored in Section 1.3.7 (/study/app/business-hl/sid-351-cid-762729/book/tool-circular-business-models-id-36523/), are one way to reduce the use of resources and waste. Countries are also forcing businesses to reduce air pollution because of its negative impact on human health. Businesses that pollute their natural environment will need to reduce pollution or face fines or closure.

Figure 6. Air pollution is a major problem in many Indian cities due to emissions from coal-powered energy sources. Businesses need to reduce their air pollution.

Credit: Bloomberg Creative Photos, Getty Images

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Political factors

Politics has a huge impact on business decisions. Political parties have different ideas about how much government regulation there should be of businesses. They may also change laws at short notice, affecting business operations. When new political parties come to power, this can change the expectations of business. If the government is unstable, this can increase the risk for businesses too.

The increasing popularity of Green parties that favour greater protection of the natural environment can either be opportunities or threats for businesses, depending on what products are being produced and how they produce them. Businesses that focus on sociocultural and environmental sustainability will see that change as an opportunity. Businesses that exploit the environment or produce harmful products will see that change as a threat.

Figure 7. Annalena Baerbock of Germany's Green Party; the Green Party signed a government coalition agreement in December 2021.

Source: Stefan Kaminski (https://commons.wikimedia.org/wiki/File:Annalena_Baerbock_(square).jpg), CC BY-SA 4.0 (https://creativecommons.org/licenses/by-sa/4.0), via Wikimedia Commons

Legal factors

Businesses must follow all laws and regulations. These laws may be made at a national, regional, or local level. Multinational companies must obey the law in their home country as well as other countries in which they operate. Businesses must be aware of changing laws so they can adapt their products and operations as needed. Some businesses try to influence the laws to their favour. This is called lobbying, and this practice has ethical impacts.

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Businesses need to be aware of the laws that are relevant to their activities. Complying with laws is an ethical responsibility as well as a legal one. In addition, businesses can be sued in court by private individuals or groups, or prosecuted by governments, if they have harmed stakeholders or violated laws. Breaking the law can mean the end of the business itself.

Ethical factors

Business activity should serve human needs and respect the health of the planet. Many businesses, however, have conflicts between the goals of business growth and profit and their social and/or environmental responsibilities. Ethics is a key concept of the course, and these ethical conflicts will be explored often in your class.

Concept

Ethics

Ethics refers to moral principles that govern the behaviour of a person or groups. Businesses are often engaged in the question of 'what is the right thing to do?'. Ethical responsibilities in business come from the relationships and networks that are formed when business organisations are started.

The pressure from shareholders or owners to increase profits can cause businesses to make unethical decisions. This pressure may even lead businesses to develop and promote products that harm people.

Shortly before it developed one of the lifesaving COVID-19 vaccines, US company Johnson & Johnson was found to be a leading supplier of opioids that contributed to painkiller addiction and death in the United States. The company has been ordered to pay hundreds of millions of dollars for its role in that crisis (https://www.theguardian.com/us-news/2021/jul/21/us-opioid-settlement-state-attorneys-general-johnson-and-johnson).

Some companies that make harmful products, from cigarettes, sugary cereals, addictive social media apps and financial advice that allows companies to avoid paying their fair share of taxes, have ethical problems at the core of their business models.

Student view

Figure 8. Social media addiction has become an ethical issue for companies that run the platforms.

Credit: KARRASTOCK, Getty Images

Even when their core business is not a problem, businesses can have ethical conflicts related to their impact on the environment or treatment of employees. These issues include poor working conditions, below-living wages and discrimination.

Multinational companies, in particular, face ethical conflicts issues. These companies have complex networks of suppliers and they are often not fully aware of labour practices in firms that supply their products. Some other companies avoid fully employing workers. Instead, they treat employees as freelance employees in the 'gig' economy. This allows them to avoid following some labour laws. They can also avoid paying social security taxes to governments. Uber is an example of a company that has engaged its workers this way. The company has faced several unfavourable court decisions (https://www.reuters.com/world/europe/dutch-court-rules-uber-drivers-are-employees-not-contractors-newspaper-2021-09-13/) about its labour practices in the past.

Exam tip

When using the SWOT/STEEPLE tool, it is important to remember to clearly distinguish between internal factors and external factors.

The strengths and weaknesses part of the SWOT only refer to internal factors. The opportunities and threats part of the SWOT only refer to external factors.

It is a common mistake for students to confuse strengths and opportunities, as well as weaknesses and threats, so you need to be aware of this.

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If you are interested in extending your understanding of SWOT, for example in the internal assessment, you may want to look at the TOWS matrix by searching for it online. This is not an official tool in the IB Business Management course, but it can be helpful.

Activity

Imagine that you have set up a small farm near a large city. Multiple stakeholders are part-owners of the farm. Customers pay a membership fee to own a share of the harvest and they also pay for a weekly basket of fresh products from the farm and its partner farms in the region. A basket usually consists of seasonal vegetables and fruits, eggs and bread.

Link the following external factors that affect the farm with the appropriate areas of a SWOT matrix. There may be more than one possibility depending on your reasoning. Be ready to explain and discuss, perhaps with a partner.

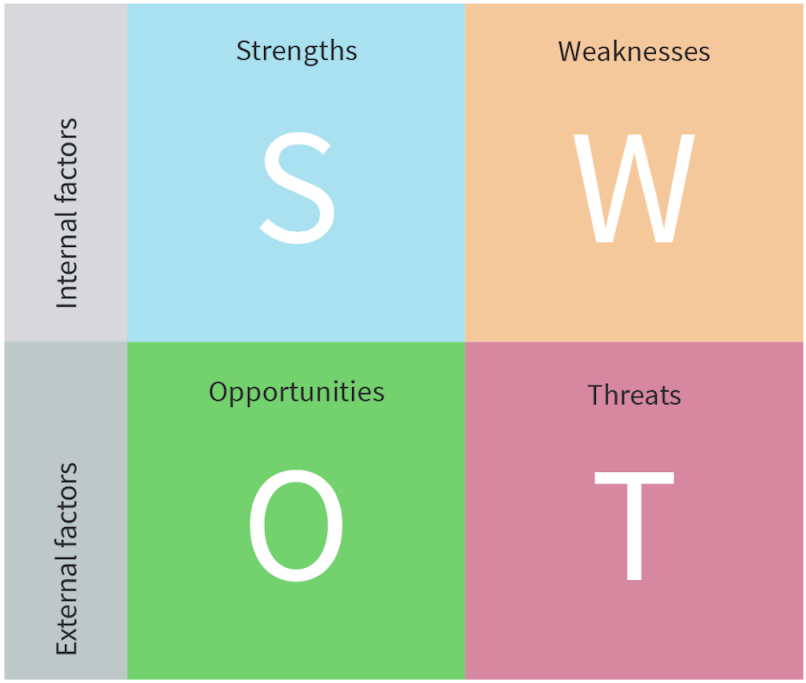

Figure 9. SWOT matrix.

More information for figure 9

The image is a SWOT matrix diagram divided into four quadrants. Each quadrant represents a factor of the SWOT analysis: Strengths, Weaknesses, Opportunities, and Threats. The left side of the matrix is labeled "Internal factors" encompassing the Strengths and Weaknesses quadrants. The lower side of the matrix is labeled "External factors" encompassing the Opportunities and Threats quadrants. The top-left quadrant, labeled "Strengths," is shaded in blue. The top-right quadrant, labeled "Weaknesses," is shaded in orange. The bottom-left quadrant, labeled "Opportunities," is green. The bottom-right quadrant, labeled "Threats," is pink. Each quadrant contains an initial letter: 'S' for Strengths, 'W' for Weaknesses, 'O' for Opportunities, and 'T' for Threats. This structure helps in organizing and analyzing internal and external factors that impact an organization.

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Question

Are the following external factors strengthsm weaknesses, opportunities or threats?

1. The government has just agreed to provide financial support for farms in the region through subsidies.
2. A number of staff have complex family situations that can make them unreliable; you worry that some may quit.
3. There has been an outbreak of bird flu in the region.
4. There is an increasing number of restaurants in the city offering plant-based menus and who are looking for regional partners.
5. The climate in your region is experiencing more extremes. There is often flooding in winter and drought in summer.
6. You have very strong relationships with reliable suppliers of your inputs.
7. There are issues with getting customers to pay on time for their weekly basket deliveries.
8. You have two talented volunteer graphic designers on your team who can develop eye-catching advertising materials.

1. Opportunity — external, political/economic
2. Weakness — internal, human resources
3. Threat — external, environmental
4. Opportunity — external, economic/sociocultural
5. Threat — external, environmental
6. Strength — internal, operations
7. Weakness — internal, financial
8. Strength — internal, marketing/human resources

Suggest one more strength, weakness, opportunity and threat to demonstrate that you understand how to classify these factors.

Activity

Learner profile: Knowledgeable; Inquirers
Approaches to learning: Thinking skills (transfer), Research skills (information literacy)

Prepare a SWOT analysis for your school. This could either be:

- a quick exercise, where you organise information you know from personal experience or anecdotes, perhaps discussing with a partner or in small groups; or

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- a longer investigation where evidence is gathered from a variety of primary and secondary sources to support the analysis, again perhaps done with a partner or in a small group.

7. The business management toolkit / 7.1 The business management toolkit

Tool: Ansoff matrix

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As you have learned in Subtopic 1.5 (/study/app/business-hl/sid-351-cid-762729/book/the-big-picture-id-36532/), many organisations aim to expand, in a traditional sense, by growing revenues and profits. Most of them are interested in developing rather than staying still and, in doing so, they have many possible options.

The potential avenues for growth were classified by Igor Ansoff, a Russian–American mathematician and business strategist. Ansoff grouped the different options for growth into four categories, based upon combinations of two criteria: products and markets. The four options are often depicted in a matrix like the one in **Figure 1**. This is known as the Ansoff matrix. The matrix can be used with both internal and external growth strategies.

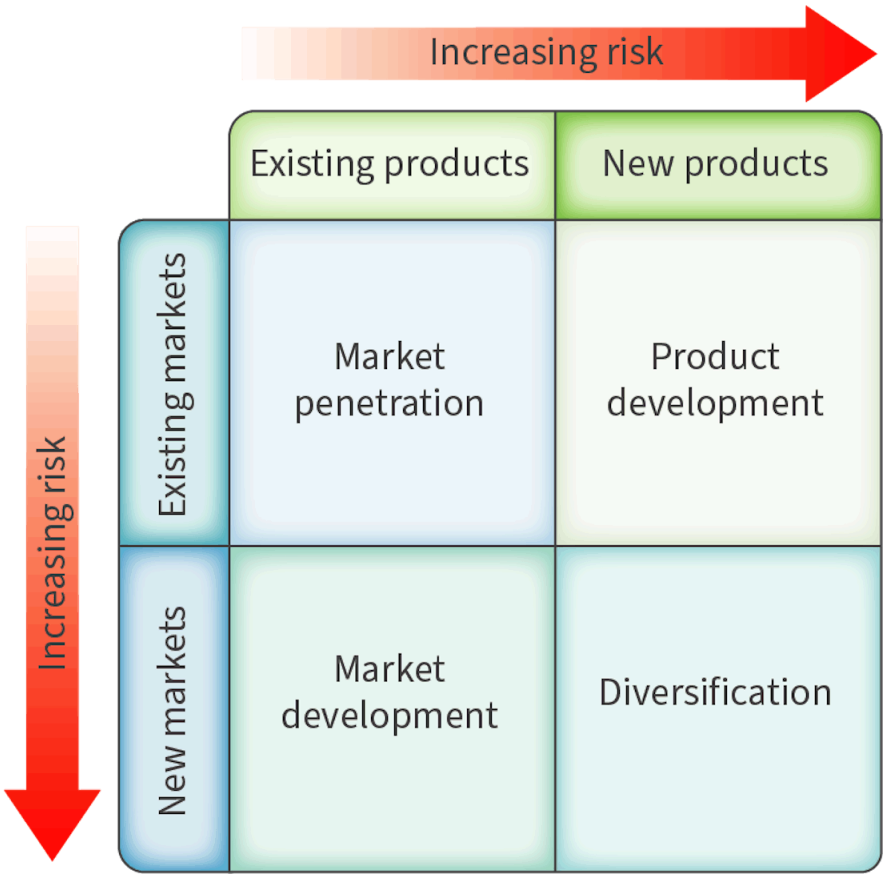

Figure 1. The Ansoff matrix describes potential revenue growth strategies.

Student view

More information for figure 1

The image is a diagram known as the Ansoff Matrix, which illustrates growth strategies for businesses based on products and markets. It is a 2x2 grid. The horizontal axis represents products, with 'Existing products' on the left and 'New products' on the right. The vertical axis represents markets, with 'Existing markets' at the top and 'New markets' at the bottom. The four quadrants within the grid are labeled with different strategies: 'Market penetration' is in the top left quadrant, 'Product development' is in the top right, 'Market development' is in the bottom left, and 'Diversification' is in the bottom right. The diagram also includes arrows indicating increasing risk, with one arrow pointing right and labeled 'Increasing risk' for new products, and one arrow pointing down and labeled 'Increasing risk' for new markets.

[Generated by AI]

Market penetration

The market penetration strategy involves selling more of the same products and services to the same customers, or at least the same types of customers. The market penetration strategy is usually considered the least risky growth strategy as it rarely entails making large investments. In the case of a neighbourhood bakery, for example, market penetration might involve extending hours, changing pricing strategies, or using loyalty cards or other promotion strategies in an attempt to increase sales. However, these strategies may only produce a temporary increase in revenues.

Figure 2. Selling more of the same products to existing customers, for example by lowering prices through a sale, is considered a market penetration strategy.

Credit: JackalPan., Getty Images

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In many cases, market penetration does not allow the organisation to grow and develop as fast as it would like. It may be that most potential customers cannot be persuaded to buy more. In the case of bread, for example, a customer purchasing to meet the needs of their family has a limited demand. Or it may be that there are many competitors in the market, so that increasing sales requires winning customers over from other businesses. Many organisations find themselves in circumstances where greater change and risk-taking are required in order to develop. This may involve one of the other three strategies in the Ansoff matrix.

Product development

Product development involves selling new products within the organisation's existing market, often to existing customers. In the example of the bakery, product development might involve selling cakes, sandwiches or beverages to complement the simple baked goods.

Product development usually involves some risk because it requires more investment in time and resources. The bakery will have to experiment with sandwich offerings or various cake recipes to see which ones are popular. Investment in storage and refrigeration equipment may be required. These efforts may distract the owner from the core business of making bread. Efforts to sell new products may fail if managers do not understand customers' needs and expectations.

Figure 3. Selling new products in the same market is considered a product development strategy.

Credit: Luis Alvarez, Getty Images

Student view

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Market development

Market development involves selling existing products to new customers. In the bakery example, this might involve opening a bakery in a new location and selling the same products in the new shop as the original shop.

Market development is considered riskier than a market penetration strategy. This is because the organisation may not understand the needs of the new customers, so its offerings might not be adapted to the new market.

There are several different types of market development strategies:

- Market development strategies often involve a new geographic market, such as moving to a new neighbourhood, a new town or even a new country.
- Market development can also involve selling the existing product to a new demographic group or target market. For example, Crocs were originally designed for use by boating enthusiasts before they were marketed to a wider range of people.
- Another example of market development is a company that begins selling directly to individual customers and families when the previous model was based on selling only to other businesses. Companies in the personal computer industry grew this way when individuals and families began to purchase computers that had initially been designed for office use.

Figure 4. Selling existing products in a new market is classified as market development.

Credit: Michael H, Getty Images

Student view

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Exam tip

How to apply the categories in the Ansoff matrix is not as obvious as it might seem. When asked to apply the Ansoff matrix in an exam context, it is therefore important to justify your choice of the classification of different strategies.

It is also helpful to draw the matrix and place the example from the case study in the matrix, as well as to explain it in a paragraph.

Finally, do not forget to consider the risks involved in each strategy as you analyse and evaluate the situation or make recommendations.

Diversification

Finally, diversification involves selling new products in a new market. In the bakery example, this would mean selling new types of baked goods in a new geographic market or to a new target market.

This is considered the riskiest growth strategy, as the business is involved in activities where it may have little knowledge. There is a chance of making costly mistakes.

If the new activity has some similarities with the existing business, it may be considered related diversification. For example, if the baker decides to open a chocolate shop in a new location there may be some similarities to their existing activity. Their expertise in terms of managing a small shop and satisfying customers will be useful in running the new business. If, on the other hand, they decide to sell furniture online, little of their existing expertise will be relevant. This is called unrelated diversification. Therefore, engaging in diversification that is unrelated to the original business is, in most cases, the riskiest growth strategy of all.

Student view

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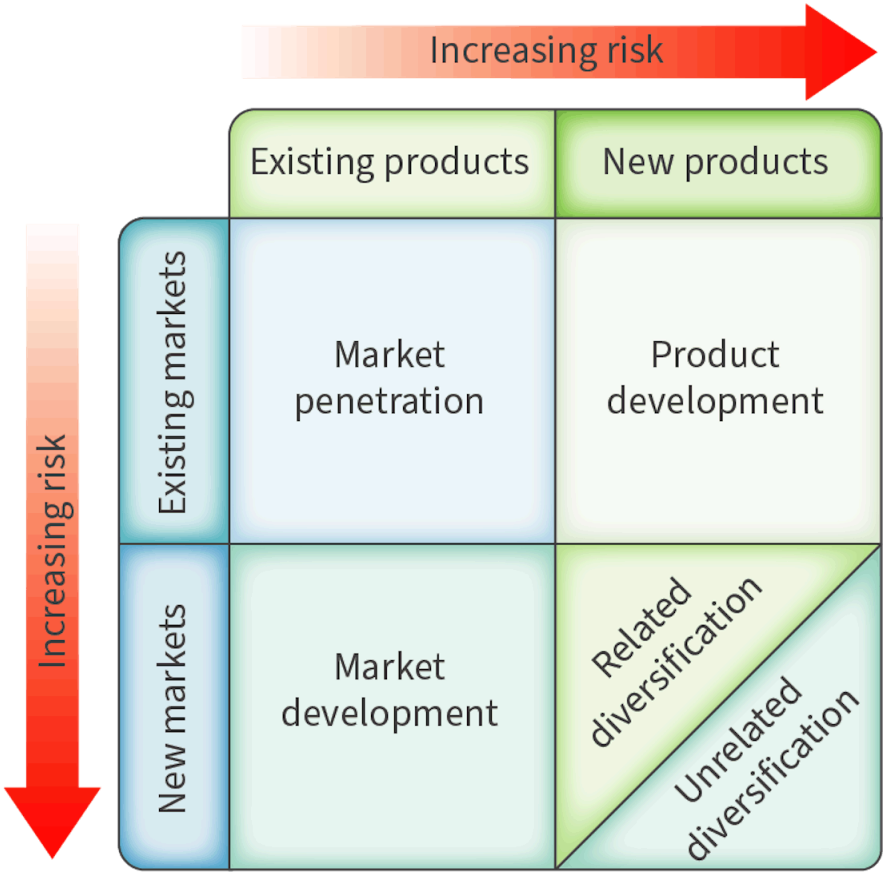

Figure 5. The Ansoff matrix showing the different diversification strategies.

More information for figure 5

The image is an Ansoff matrix, which is a 2x2 grid used to show different diversification strategies. The top axis represents products, with 'Existing products' on the left and 'New products' on the right. The side axis represents markets, with 'Existing markets' at the top and 'New markets' at the bottom. The matrix creates four quadrants: 1) 'Market penetration' in the top-left quadrant, indicating low risk based on existing products and markets; 2) 'Product development' in the top-right quadrant, focusing on new products in existing markets; 3) 'Market development' in the bottom-left quadrant, indicating the introduction of existing products into new markets; 4) The bottom-right quadrant is divided diagonally into 'Related diversification' and 'Unrelated diversification,' representing strategies with varying degrees of risk. An arrow indicating increasing risk runs diagonally across the matrix from 'Market penetration' to 'Unrelated diversification,' showing how risk increases both vertically and horizontally across the matrix.

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Activity

Learner profile: Knowledgeable
Approaches to learning: Thinking skills (critical thinking, transfer)

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Read the following situations and identify how each activity would be positioned in the Ansoff matrix.

	Market penetration	Product development	Market development	Diversificatior
Zara is launching a new line of T-shirts to its current markets.				
Sony is launching a sale with a 5% reduction in price on the PS5.				
Tata Motors is selling its Nexo EV in a new market in South Africa.				
Danone is engaging in a joint venture with a dairy company in Mexico, to produce a new line of desserts.				

3 section questions

Question 1

Which is generally considered to be the riskiest strategy in the Ansoff matrix?

Student view

1 Diversification ✓

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2 Market penetration

3 Product development

4 Market development

Explanation
Diversification is risky because the company is entering an unknown area of business, with both products and markets that are new.

Question 2

Which strategy involves selling more of the same product in the same market?

1 Market penetration ✓

2 Diversification

3 Product development

4 Market development

Explanation
The market penetration strategy is considered the least risky development strategy since it is selling the same products in the same market.

Question 3

Selling a new product in the same market is called:

Product development ✓

Accepted answers
Product development, Product development strategy

Also accepted
desarollo de productos, Desarollo de productos, Estrategia de desarrollo de productos, product devolpment

Explanation
Product development involves selling new products in the organisation's existing market, usually to existing customers.

Student view

Tool: Circular business models

You may have walked through a forest and seen leaves scattered on the ground, perhaps along with plastic waste. Over the course of a few months, nature will decompose the leaves to form new fertile soil for the trees and plants. The plastic will take hundreds of years to break down.

Figure 1. Nature wastes nothing; humans waste too much.

Credit: ROBERT BROOK/SCIENCE PHOTO LIBRARY, Getty Images

Circular business models aim to get businesses to work more like nature, by designing systems that feed back outputs as inputs, and designing out waste from the start. The short video below from the Ellen MacArthur Foundation, which you learned about in Section 1.3.5 (/study/app/business-hl/sid-351-cid-762729/book/strategies-and-tactics-id-36521/), explains the circular economy.

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Video 1. Explaining the circular economy.

International Mindedness

Circular models are not new. In fact, indigenous populations around the world are known for using circular strategies to live in harmony with nature and each other.

In the United Nations article below, many examples of indigenous cultures using circular strategies are highlighted.

For a truly circular economy, we need to listen to indigenous voices. (https://www.undp.org/blog/truly-circular-economy-we-need-listen-indigenous-voices)

One of the examples cited in the article is highlighted in the following video. (Note: the video in Spanish with English subtitles.)

Video 2. How a group of farmers in Costa Rica are using a circular model.

Student view

What can we learn bout improving global sustainability from these cultures?

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Principles of circular economy

Before exploring circular business models, it helps to understand three underlying principles that guide thinking on circularity, according to the Ellen MacArthur Foundation (https://ellenmacarthurfoundation.org/).

Concept

Creativity and Sustainability

Moving from a take—make—waste linear economic system to a more sustainable system that is based on circular principles depends upon designers and manufacturers thinking creatively. From the moment they have an idea about meeting a human need or solving a problem, designers and manufacturers need to consider how to embed circularity into choices of materials, manufacturing process, and the product's end of life.

This requires moving away from current materials and processes and reimagining or inventing new materials, manufacturing and recovery. New business models need to be used, requiring flexible thinking across traditional disciplines.

Table 1. Principles of a circular economy.

Principle	Description
1. Eliminate waste and pollution	Waste and pollution are design flaws. We can design products from the start to be circular.
2. Circulate products and materials	With planning and good design, we can ensure that products can be reused, repaired or remanufactured. Food and packaging should be circulated, avoiding landfills.
3. Regenerate nature	Nature wastes nothing. If we return nutrients to the Earth's systems, we can enhance and rebuild natural resources.

Activity

Learner profile: Knowledgeable
Approaches to learning: Thinking skills (critical thinking, creative thinking)

Watch the short video below, which shows some examples of how waste is being designed out of products.

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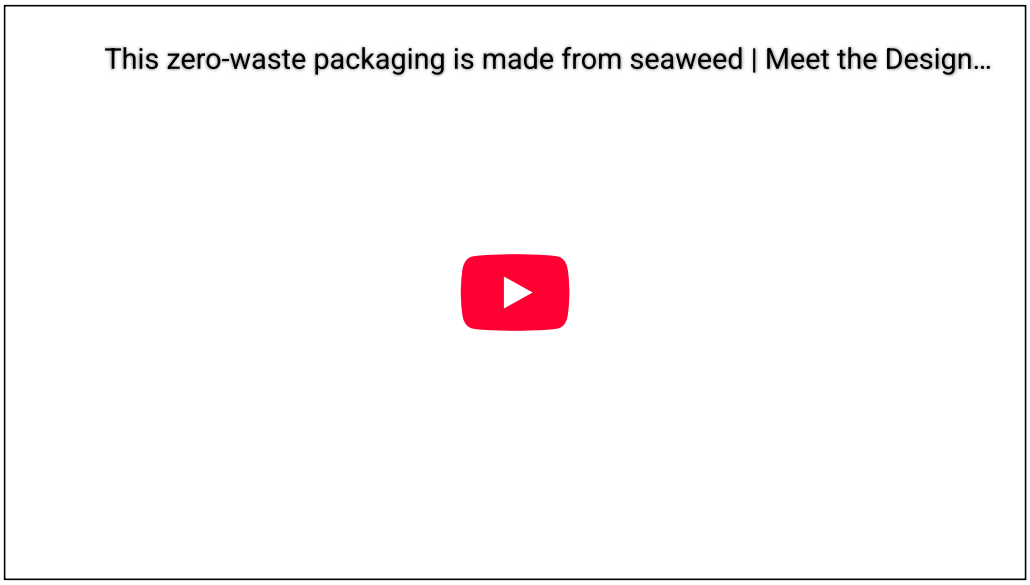
1. Describe the two innovations highlighted in the video.
2. Explain how those innovations are designing out, or eliminating, waste and pollution (the first principle of circular economy).
3. Towards the end of the video, Serena Pozza from DSM-Niaga says that circular innovations exist, but they need to be scaled up.
   - What does she mean?
   - What is the role of businesses in scaling innovations?
   - What is the role of consumers in scaling innovations?

The following two companies feature in the video :

- Notpla: packaging developed by Skipping Rocks Lab
- Niaga: closed loop mattresses



Video 3. Examples of zero-waste packaging.

Circular business models

There are a number of circular business models that businesses can adopt to move away from linear production systems. They aim to decouple revenues from resource production to reduce resource extraction, greenhouse gas emissions, pollution and waste, and biodiversity loss. While each of these models represents a distinct strategy, most businesses engaged with circularity will adopt elements of multiple strategies. This will be explored at the end of this section by looking at the fast-fashion retailer H&M.

Making connections

The OECD has published an extensive description and evaluation (https://www.oecd-ilibrary.org/sites/e59f8dd6-en/index.html?itemId=/content/component/e59f8dd6-en) of all of these models. If you are interested in exploring these models in even greater depth, this

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OECD publication is a good place to start.

Figure 2. There are a variety of circular business models.

Credit: Doerte Siebke / EyeEm, Getty Images

Circular supply models

Circular supply models enable businesses to reduce new material inputs, replacing them with recovered or bio-based materials. These resources can be planned into design and production decisions from the start, reducing the environmental impact in supply chains and potentially reducing the cost of resources. This model is also known as cradle-to-cradle product design, to distinguish it from the cradle-to-grave linear system. Circular supply models are modelled on natures; the outputs of a business feed back into the production process as inputs.

Resource recovery models

Resource recovery models are closely related to circular supply models. However, instead of focusing on the businesses that use the circular materials in their products, these models focus on the business collecting, sorting and processing waste materials.

According to the OECD, the three main activities involved in resource recovery models are:

- **collecting** waste materials produced by households and businesses. This is often organised by local governments but can also be done in partnership with for-profit social enterprises (see Section 1.2.3 (/study/app/business-hl/sid-351-cid-762729/book/forprofit-social-enterprises-id-36510/)).
- **sorting** waste into different materials. In some cases, this is also done by local governments, perhaps in partnership with private enterprises.

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- **secondary production** where waste is transformed into finished raw materials. This is usually done by companies in the private sector, which then sell the raw materials to other businesses.

Figure 3. If you use recycling bins at school or at home, you contribute to the resource recovery model.

Credit: Maskot, Getty Images

Product life extension models

Product life extension models focus on extending the time that a consumer uses products. If consumers use products longer, it reduces the amount of inputs needed to create new products. Product life can be extended in a number of ways:

- **Design for durability**. With this strategy a business produces a high quality product that is meant to last. Businesses that design durable products can charge higher prices, called premium pricing, thus earning more revenue.
- **Reuse and repair**. With this strategy, businesses ensure that products are used to the very end of their life. An example of reuse is a second-hand clothing shop. Manufacturers can also offer repair services; third parties offer such services too.
- **Remanufacturing**. With this strategy, businesses 'reset the clock' on their products, recovering and remanufacturing them to start a new service life. The original or third party businesses can resell products that have been remanufactured, earning revenue on a product a second time. Examples of this are smartphones and other digital devices, which are often discarded after a short time but with a little attention can be as good as new again.

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Figure 4. A tailor can repair clothes, making them last longer.

Credit: Michael Moeller / EyeEm, Getty Images

Sharing models

You may have several products at home that are used only occasionally. Could those products be made available to others to use when you are not using them? The idea of sharing is not new. However, the idea of sharing with strangers is new.

Sharing models allow consumers to share use of products with strangers, reducing the new inputs needed for products that might be under-utilised by the consumer. The sharing is usually supported by online platforms that show what products are available, where they are, and when they are available. One example of such an online platform is Airbnb. The owners of the online platforms can take a small fee for the transactions.

There are other systems where businesses own and share the products (business to consumer or B2C). Consumers can also own the products and share them (consumer to consumer or C2C).

There are two general types of sharing models:

- **Co-ownership** involves the lending of physical goods. This could be the sharing of household tools and appliances through an online platform like Peerby.
- **Co-access** involves allowing others to take part in an activity that would have occurred anyway. For example sharing seats in a carpool for a particular journey.

Student view

Figure 5. Carpooling is an example of a co-access version of circular sharing models.

Credit: Hirug, Getty Images

Product service system models

Product service system models involve selling the service for using a product rather than selling the product itself. This model improves incentives for sustainable product design because the business wants the product to last a long time so that it can sell its services. There are two types of product service system models:

- **Product-oriented service system models** focus on selling products and associated after-sale services, such as maintaining or repairing the product through a contract or take-back agreement.
- **User-oriented product service system models** involve consumers paying for temporary access to products, usually through a leasing agreement. The business retains ownership of the product. An example is car-sharing, which is popular in urban areas. Netflix and Spotify also fall into this category.

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Figure 6. Owning music is rare these days; people usually buy music listening services instead.

Credit: Johner Images, Getty Images

Activity

Learner profile: Inquirers
Approaches to learning: Research skills (information literacy); Thinking skills (transfer)

Option 1
The fast-fashion company H&M has partnered with the Ellen MacArthur Foundation to explore and implement circular strategies in its business.

1. Read through H&M's circular strategy (https://hmgroup.com/sustainability/circular-and-climate-positive/circularity/#:~:text=We%20aim%20to%20create%20a,reused%20and%20rema
2. Identify and explain two or three ways that H&M is using circular business models to improve sustainability. Refer specifically to the models described above. Share and discuss your results with a partner or group.

Option 2
Philips is a health technology company that has increased its use of circular strategies.

1. Read through Philips' circular strategy (https://www.philips.com/a-w/about/environmental-social-governance/environmental/circular-economy.html).
2. Identify and explain two or three ways that Philips is using circular business models to improve sustainability. Refer specifically to the models described above. Share and discuss your results with a partner or group.

Limitations of circular business models

Businesses are moving rapidly to circular strategies, but there are some risks and limitations posed by these models:

- **Undeveloped systems for waste recovery**: Circular supply and resource recovery models rely on well-developed systems for waste recovery, as well as a culture shift in the wider society. There needs to be enough recovered waste, at a reasonable cost, for these models to work.
- **Increased use of bio-based materials** for products may result in there being less land for food production, which could result in less biodiversity.

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Figure 7. Harvesting plants (such as corn) in order to make bio-based materials to replace plastics could result in more land conversion, which would harm biodiversity.

Credit: Roelof Bos, Getty Images

- **Negative unintended consequences:** It is important to take a system view when thinking about circular business strategies, in order to avoid unintended negative consequences. For example, Airbnb has been blamed in part for raising housing costs and turning quiet neighbourhoods into noisy tourist centres in some cities.

Figure 8. Temporary apartment rentals to tourists have disrupted housing markets and degraded quiet neighbourhoods for residents.

Credit: South_agency, Getty Images

- **Rebound effects:** When businesses or consumers save money by using recycled inputs or products, they may take the savings and use them for increased production or consumption. This can negate the reduction of CO_2 emissions or the resource benefits of the circular model.

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- **Circular strategies may not counter growth-oriented business models**: The core business model of some businesses may be so damaging that circular strategies are not enough to mitigate the harm. Many fast-fashion retailers have a core business model that depends on excessive consumption of clothing, so the environmental damage is likely to continue, even with circular strategies in place.
- **Circular business models do not address social issues**: Generally, circular business models are concerned with environmental and economic sustainability, but not with sociocultural sustainability. So businesses that use circular strategies must also consider other methods to address their impact on society.

Activity

There are many possible activities to help you understand and apply circular business models. For each of the business models listed in this section, see if you can:

- Explain how a business involved in that model could earn profits. Consider the costs for the business, as well as how revenues are earned.
- Identify two or three businesses using circular strategies in your city or town. Share your insights with a group. Several of you could work on a circular resource guide for the school community as a CAS project, focusing on one or more types of businesses such as second-hand clothing.
- Identify one or two ways that your school could use a circular business model to improve sustainability. Pitch the idea to your school administration to see if the plan can be implemented. This could also be a CAS project.
- Consider how your school's events or festivals could become more circular. Can you plan and implement a zero-waste school event? Again, this could make an interesting CAS project for a group of students.
- Choose a favourite household item and explain two ways in which the business that made the item could have used circular strategies to improve its sustainability. You could present your ideas to the class for feedback.
- Research whether there are regulations in your city on short-term rentals, shared bicycles or scooters, or other regulations on circular businesses that aim to mitigate unintended negative consequences.

Making connections

If you want to learn more about the circular economy or circular business models, the following resources may be interesting for you:

- Ellen MacArthur Foundation (https://ellenmacarthurfoundation.org/)
- Fashion Revolution (https://www.fashionrevolution.org/)

And here are some online courses:

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- Circular economy: An Introduction (https://www.edx.org/course/circular-economy-an-introduction)
- Circular economy: An Interdisciplinary Approach (https://www.edx.org/course/circular-economy-an-interdisciplinary-approach)
- Circular economy: Sustainable Materials Management (https://www.coursera.org/learn/circular-economy)
- Circular Business Models for Sustainable Urban Food Systems (https://www.futurelearn.com/courses/circular-business-models-for-sustainable-urban-food-systems)
- Circular Fashion: Design, Science and Value in a Sustainable Clothing Industry (https://www.edx.org/course/circular-fashion-in-a-sustainable-clothingindustry)

Tool: Business plan

What is a business plan?

A business plan is a tool used to describe a business. This could be a new business, or an existing business that is making a large change. The tool is important for a business to think through the key aspects of its operations. A business plan helps people to believe in the entrepreneur (gives them credibility), reduces risk, and inspires others to join them.

Activity

Learner profile: Risk-takers
Approaches to learning: Thinking skills; social skills; communication skills; self-management skills; research skills

An interesting long-term activity for you and your teacher would be to develop a business plan for a new business, either individually or in small groups.

You could work on the plan throughout the course, adding information as you learn about the main functions of business. Towards the end of the course, or at another suitable time, you could decide to pilot the business idea. You could also enter one of many entrepreneurship competitions that have sprung up around the world. Your teacher may have ideas about where to submit your idea.

Student view

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Figure 1. A business plan is a key part of starting a new business.

Credit: andresr, Getty Images

Like any piece of writing, a business plan must consider its purpose and audience. It is very likely that an entrepreneur will have several business plans that can be used for different situations.

There are a number of different purposes for a business plan that will help determine the format of the document and there is no one format for a business plan. Plans range from very informal to very formal depending on what the entrepreneur wants to achieve and who the audience is.

In the early stages, these plans may be very simple. A simple plan can be used for an internal working group that is developing the business idea. Later, these plans will be more formal as the entrepreneur seeks partners, funding, market recognition or attempts to grow their ideas.

A business plan is a story, supported by evidence

Human beings connect with stories. We have what psychologists call a narrative bias. Narrative bias is an example of a heuristic, or mental short-cut that we use to understand the world quickly and easily. We like stories because they make sense of a complex world. Stories often provide an answer to the question, 'why?'.

Successful business plans provide a story for the audience. An entrepreneur and their business plan needs to connect with people on an intuitive or emotional level first, to take advantage of this part of human nature.

Student view

Theory of Knowledge

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Understanding cognitive biases, also known as heuristics, is important for recognising flaws in thinking and judgement as we try to build knowledge and understanding of the world around us. You will likely learn about these cognitive biases or heuristics in your Theory of knowledge course.

Figure 2. Telling a good story is key to a successful business plan.

Credit: Maskot, Getty Images

Storytelling, however, is not all there is to a business plan. Human beings often make decisions using intuition but they justify their decisions based on evidence and data. So, entrepreneurs need to provide both a story *and* evidence to win over their audience. A business plan must be able to prove that the business will be successful.

There are a number of different ways to gather evidence for your business plan. Secondary research , also known as desk research, involves using evidence gathered by others. This information can be found in news articles, research journals, company and market reports, and other reliable sources. Research that is relevant to your business, but done by others, can save time and often involve expert analysis.

If possible, however, an entrepreneur should also do primary research. This involves creating new information. This information can be gathered by you through surveys, interviews, observations, focus groups, or other methods. Primary research can be more specific for a particular product or market. It is a good complement to secondary research.

Student view

The presentation of evidence in your business plan can take a number of forms. Complex quantitative data (numerical) is best presented in simple graphics such as line and bar graphs, pie charts, or scatter plots. Qualitative data, which involves descriptions or explanations from

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interviews, surveys, or other methods with open-ended response types, can sometimes be quantified and presented in graphic format. You can also present anecdotes or quotes from your research to support ideas.

Activity

Learner profile: Inquirers
Approaches to learning: Research skills (information literacy)

Explore the investigation tools in the Youth Mayors Field Guide Toolkit (https://www.sites.google.com/uwcmaastricht.nl/youth-mayors-curriculum/toolkit). There are instructions for a great variety of primary research methods to help you with your business plan. If you want to learn how to do full research for a changemaking project or a new business, the guide provides an explanation of how to do this.

The guide also has a number of other helpful tools to explore, including a business plan template, budget template, advice for networking and pitching ideas, among others.

Figure 3. Data and evidence are vital to support your business story.

Credit: Tom Warner, Getty Images

More information for figure 3

A businesswoman stands in front of multiple digital screens, pointing and presenting data. The screens display various types of data visualizations. One screen shows bar graphs, with data points arranged in columns, indicating different categories or time periods. Another screen presents pie charts, illustrating different segments and their proportions. There are also world maps with highlighted regions, suggesting geographic data distribution. Additionally, there are line graphs indicating trends over time, with axes labeled according to the data collected.

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Student view

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Starting a new business is very risky, but carrying out good research can reduce risks. Market research will be explored in greater detail in **Subtopic 4.4**. However, other types of research must also be done. This includes researching legal structures for the business, product and operations research, costs, labour conditions and competition.

In addition, before developing a business plan for an audience, you need to know who the audience is. You also need to know their interests and expectations. This will determine what information you include (or exclude) in your business plan. The audience and their expectations will also affect the format of the business plan and how formal it is.

Concept

Creativity

Creativity involves coming up with new ideas. It also involves rethinking existing ideas from new perspectives. Businesses may show creativity in their use of inputs, business processes and outputs. They also demonstrate creativity when they solve problems. The business plan is a key area to show the creativity of a business.

Elements of a business plan — The Golden Circle

The Golden Circle, described by motivation expert Simon Sinek (https://simonsinek.com/), is a good way of thinking about the basic elements of a business plan. The Golden Circle includes the Why, How and What of the business. The Why always comes first. But the presentation of the What and the How is flexible in the business plan.

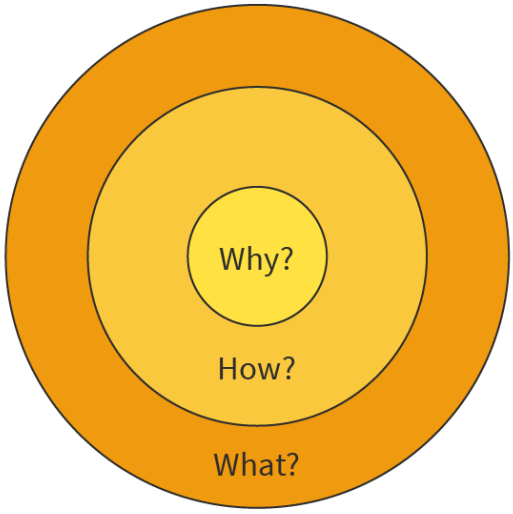

Figure 4. The Golden Circles.

More information for figure 4

Student view

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The image is a diagram known as The Golden Circle, which consists of three concentric circles. The innermost circle is labeled 'Why?', the middle circle is labeled 'How?', and the outermost circle is labeled 'What?'. The design visually emphasizes the central importance of 'Why', suggesting that this should be the focal point before addressing 'How' and 'What'. This concept, developed by Simon Sinek, is used to explain the core elements of a business plan, where understanding the purpose ('Why') drives the methods ('How') and the outcomes ('What').

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Why

First, it is important to consider the inner circle, the ‘Why’ of the business. This is the purpose of the business. The purpose is important for motivating the people who are working to start the business. It is also important to build a network of people around the business who can support it. The Why of the business satisfies the human need for stories. It provides a clear, shared understanding of the goal.

To articulate the Why of the business, the business plan will typically have a:

- vision and/or mission statement, which could also be expressed as a guiding question for the business; and a
- description of the problem you are trying to solve with your product.

How and what

The ‘How’ elements of a business plan address the way you will produce your product. This could include information on the production processes. It will also include information on how the business will be set up and run.

The ‘What’ element of a business plan is about your product itself. What are the characteristics of the product you are offering?

Typically, the How and What of your business will be combined in several parts of a business plan (along with relevant sections of this course):

- Description of the solution to the problem you have described. This would include:
  - a product description (**Subtopic 4.5**)
  - the legal structure of the business (Subtopic 1.2 (/study/app/business-hl/sid-351-cid-762729/book/the-big-picture-id-36507/))
  - the human resources needed (**Subtopic 2.1** and **Subtopic 2.2**)

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- the location and facilities (**Subtopic 5.4**)
- the value that your product will bring and how your business will positively affect multiple stakeholder groups (Subtopic 1.4 (/study/app/business-hl/sid-351-cid-762729/book/the-big-picture-id-36525/)) and the environment. You will need to consider what positive impacts your business can have on the local and global scales in both the social and environmental domains (Subtopic 1.3 (/study/app/business-hl/sid-351-cid-762729/book/the-big-picture-id-36515/))

- Description of the market and competition or partners (social business) (**Subtopic 4.4**)
- Marketing plan (**Subtopic 4.2**)
- SWOT Analysis (Subtopic 1.1 (/study/app/business-hl/sid-351-cid-762729/book/the-big-picture-id-36497/))
- Cash flow forecast and budget (**Subtopic 3.7** and **Subtopic 3.9 HL**)
- Sources of finance, or request for financing if appropriate (**Subtopic 3.2**)

Figure 5 provides a sample structure for a business plan.

1. Executive Summary

2. Mission / Vision

3. The Problem

4. The Solution
- 4.1 Overview
- 4.2 Value proposition
- 4.3 Type of organisation
- 4.4 Human resources
- 4.5 Location
- 4.6 Facilities

5. The Market (or social/partnership ecosystem if not a business)
- 5.1 Competition (Partners)
- 5.2 Position in the market (Relationship with partners)
- 5.3 Unique selling points (Value proposition)

6. Marketing / Communications Plan
- 6.1 Marketing / Communications objective
- 6.2 Target market / Audience
- 6.3 Marketing / Communications budget
- 6.4 Market / Target audience research
- 6.5 Limitations of market / Target audience research

7. SWOT
- 7.1 Strengths (internal)
- 7.2 Weaknesses (internal)
- 7.3 Opportunities (external)
- 7.4 Threats (external)

8. Sources of Finance

9. Budget

10. Milestones

Figure 5. Sample business plan structure.

Student view

Overview (/study/app/hl/sid-351-cid-762729/o

More information for figure 5

The image displays a structured layout of a sample business plan. It contains numbered sections and subsections, each with specific focus areas. The main sections include: 1. Executive Summary, 2. Mission / Vision, 3. The Problem, 4. The Solution, 5. The Market, 6. Marketing / Communications Plan, 7. SWOT, 8. Sources of Finance, 9. Budget, and 10. Milestones. Subsections under these categories detail specific components. For example, 'The Solution' covers overview, value proposition, type of organization, human resources, location, and facilities. 'The Market' discusses competition, market position, and unique selling points. 'SWOT' breaks down into strengths, weaknesses, opportunities, and threats.

[Generated by AI]

However, there are other ways of organising business plans. The Social Business Model Canvas (https://bmtoolbox.net/tools/social-business-model-canvas/) is a one-page summary specifically for social enterprises, which we will explore in **Subtopic 1.2**. The Flourishing Business Model Canvas (https://flourishingbusiness.org/flourishing-business-canvas/) is another interesting format. This plan is even more oriented on the social and environmental context of a business.

As we mentioned before, there is no one structure or format for a business plan. You should choose a structure that makes sense for your business, its purpose and the audience. You may have several plans, of different lengths and formality depending on the context. Give it a try!

7. The business management toolkit / 7.1 The business management toolkit

Tool: Force field analysis (HL)

Tool: Force field analysis (HL) Tool: Force field analysis (HL)

Section Student... (0/0) Feedback Print (/study/app/business-hl/sid-351-cid-762729/book/tool-force-field-analysis-id-36680/print/) Assign

Kurt Lewin was a German academic who migrated to the United States in 1933. Much of Lewin's work focused on the dynamics of change.

In Section 1.1.6 (/study/app/business-hl/sid-351-cid-762729/book/tool-swotsteeple-analysis-id-36504/) you learned about how organisations must change in order to adapt to shifts in the external environment. But change can be difficult for individuals and entire organisations, generating fear and resistance, especially if communication is poor.

Student view

The force field diagram that Lewin developed can be used to study the factors that support or promote change (driving forces), and those that oppose or resist change (restraining forces). Each force is assigned a number, which is meant to indicate whether the force is relatively powerful (5) or

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weak (1). The framework for this is illustrated in **Figure 1.**

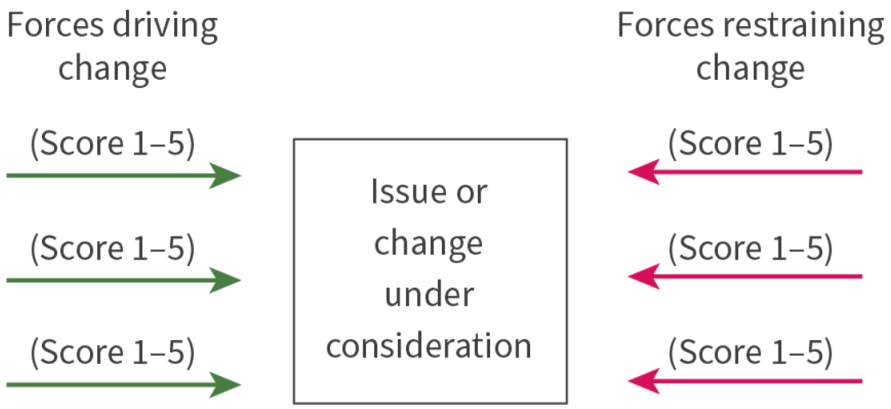

Figure 1. Force field analysis.

More information for figure 1

This diagram illustrates a force field analysis that shows forces driving and restraining change. To the left, there are arrows pointing towards a central box labeled "Issue or change under consideration," representing forces driving change. Each of these arrows is assigned a score ranging from 1 to 5, indicating their strength. On the right, there are arrows pointing away from the central box, representing forces restraining change, also scored from 1 to 5. The purpose of the diagram is to evaluate the factors that either support or oppose a particular change, with the scoring system used to assess the relative strength of each force.

[Generated by AI]

Once the diagram is complete, it is possible to identify which elements need to be modified in order to create change. Driving forces can be reinforced and restraining forces can be weakened. This will make it more likely that the desired change will occur.

For example, take a company that has invested in sophisticated new IT technology. Some employees may resist using the new equipment and insist that the old system works better. How can managers encourage employees to adopt the new technology? **Figure 2** shows how a force field analysis could be applied to this problem.

Student view

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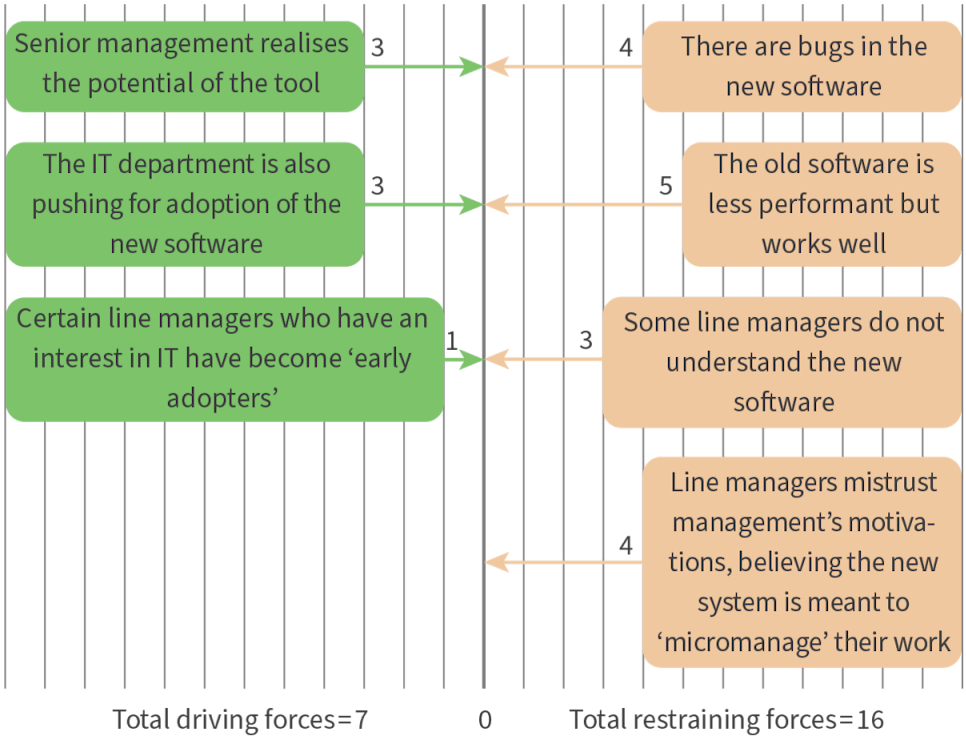

Figure 2. Application of force field analysis: driving and restraining factors for the introduction of new management software.

More information for figure 2

The diagram is a force field analysis depicting the driving and restraining forces for adopting new management software. On the left side, three driving forces are listed in green boxes with arrows pointing to the center: 1) "Senior management realizes the potential of the tool" with a weight of 3, 2) "The IT department is also pushing for adoption of the new software" with a weight of 3, and 3) "Certain line managers who have an interest in IT have become 'early adopters'" with a weight of 1. The total driving forces are 7.

On the right side, four restraining forces are listed in orange boxes with arrows pointing to the center: 1) "There are bugs in the new software" with a weight of 4, 2) "The old software is less performant but works well" with a weight of 5, 3) "Some line managers do not understand the new software" with a weight of 3, and 4) "Line managers mistrust management's motivations, believing the new system is meant to 'micromanage' their work" with a weight of 4. The total restraining forces are 16.

[Generated by AI]

According to the weights given in the diagram, driving forces are 7 while the restraining forces are 16. After carrying out the analysis, managers can consider how to amplify the driving forces and lessen the weight of the restraining forces.

Student view

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Activity

Your school is planning to expand by opening a new branch in another city. Use the force field analysis to evaluate the driving and restraining forces for this change. Identify some evidence that could be used to determine the weightings of the forces.

Exam tip

Every time you are applying a force field analysis, remember:

- to put weightings on the factors
- that the weightings should be justified
- that the driving and restraining factors are not a list of advantages and disadvantages, although there may be some overlap
- that the driving factors are conditions that help change and restraining factors are blocking or hindering change

Evaluation of the force field analysis

Some of the uses and limitations for the force field analysis are represented in **Table 1** below.

Table 1. Uses and limitations of the force field analysis tool.

Uses	Limitations
Graphic representation of complex information; easy to understand	Requires weights for qualitative factors; weights may be unscientific/biased, they need evidence to be valid
Helps develop better understanding of stakeholders and other factors that may prevent positive change; management can plan how to reduce or eliminate restraining forces or amplify driving forces	Depicting stakeholders as restraining forces may cause conflict

7. The business management toolkit / 7.1 The business management toolkit

Student view

Tool: Hofstede’s cultural dimensions (HL)

Globalisation is the increased movement of people, products, ideas and culture across international borders. Though it is clear how globalisation has reduced cultural differences in certain areas, there are still significant differences in the values, assumptions, beliefs and practices of people in different countries. Systems and structures for managing people are uniquely determined by tradition. If a Japanese worker is asked to discuss the fairness of pay, they will probably use the proverb, 'The nail that sticks out should be hammered down', stressing the need for egalitarianism and group compliance. A US worker, however, may be dissatisfied if their contribution to the success of the company is not individually recognised in financial terms. Businesses that wish to operate in a multinational context need to understand and adapt to cultural diversity both in their internal operations with human resources and with regard to their marketing.

National cultural context

Geert Hofstede is a prominent theorist on national culture. He has referred to culture as the 'software of the mind'. In his book *Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations across Nations* (2001), Hofstede describes a study based on 1968 and 1972 survey data collected on IBM employees across more than 60 countries. His study provides insights into varying cultural traits in these countries. Through this study, Hofstede identified the following dimensions that can help to analyse cultural differences between national groups:

- **Power distance**. This is the extent to which people are prepared to accept a hierarchical power structure. This dimension explains the degree of organisational hierarchy and the extent of formality in chains of communication. Northern Europe and the USA have low power distance. This means that there is likely to be more bottom-up communication and less hierarchy. Southern Europe, Latin America and Africa are more comfortable with hierarchy and paternalism.
- **Uncertainty avoidance**. This is about the degree of tolerance that members of society have towards risk and ambiguity. People in Japan, Latin America and Mediterranean countries are more risk averse. In these countries, rules may be tighter and there is likely to be more hierarchy; there are formal chains of command. In the UK, Sweden and the USA, employees and organisations are more likely to take risks and are more comfortable with ambiguity. In these countries, there will be less hierarchy, and thinking outside the box is more common.
- **Individualism versus collectivism**. This dimension is about whether the society values individuals or the group more highly. Individualistic societies value individual contributions and are more competitive. In collectivist societies, contributions to the common good are valued and individualism is often frowned upon. In countries that are more individualistic, like the USA, you are more likely to see rewards such as performance-related pay. Higher

degrees of collectivism are found in Asia, Latin America, Eastern Europe and developing countries.

- **Masculinity versus femininity**. This dimension explains the values of the group in terms of the 'masculine' values of financial rewards, personal recognition, competition and the self as opposed to the 'feminine' values of wellbeing, personal relations, nurturing and sharing. These values might affect, for example, how common it is to provide flexible working conditions to achieve a better work–life balance. Japan, Austria and Latin American countries are considered masculine countries, while Scandinavian countries and the Netherlands are more oriented on wellbeing, relating and sharing. This can help explain why the Netherlands is the country with the highest level of part-time labour in Europe.
- **Long-term versus short-term orientation**. This dimension explores the differences in businesses in terms of the time horizon of their objectives. Some countries, particularly in Asia, are more oriented towards long-term objectives; these societies are willing to pursue more patient business strategies. Short-term thinking is associated with Anglo–Saxon countries in particular. In these countries, objectives are more focused on short-term profitability, which can put more pressure on businesses to deliver high revenues and cut costs. However, such strategies may be damaging to the business in the long term. Taking high risks to earn more revenue or cutting costs excessively can both damage the long-term health of the business.
- **Indulgence versus restraint**. This dimension is about the extent to which the society allows people to freely satisfy their basic human drives related to having fun and enjoying life. Those societies that are indulgent permit and even encourage this. However, in those societies that are defined by restraint, people are more likely to suppress personal gratification. In these societies, there may be social norms that significantly restrict people's behaviour.

Although Hofstede's study offers a framework to consider cultural differences, there are many criticisms of the work. The study originally involved IBM workers and there have been criticisms at the sampling methods of the surveys used in the study. Many also point out that culture is incredibly complex and varied, even within countries, so that it is not appropriate to generalise about culture for an entire country. Another issue with the theory is that it presents culture as a static phenomenon while in reality culture changes over time.

Activity

Learner profile: Thinkers
Approaches to learning: Thinking skills (critical thinking)

Another framework for thinking about national and organisational culture is to use two broad categories: tight and loose (https://behavioralscientist.org/tight-and-loose-cultures-a-conversation-with-michele-gelfand).

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Tight cultures have very strong social norms; deviating from these norms is frowned upon by the group. Loose cultures have weaker social norms; it is more accepted to deviate from the norms.

- Consider Hofstede's six dimensions. Do they fit into the tight—loose framework? Discuss with a partner or the class.

Activity

Learner profile: Inquirers
Approaches to learning: Research skills (information literacy)

Hofstede Insights, a culture consulting company for organisations, offers a country comparison tool (https://www.hofstede-insights.com/country-comparison/).

1. As a short activity, use the country comparison tool to find the country where you live, or a country with which you closely identify. Does the analysis of the country in terms of Hofstede's six dimensions make sense to you? Why or why not?
2. As a longer task, use the country comparison tool to identify two countries with very different cultural dimensions results. Briefly describe the results of each country and explain how the approach to **human resource management** might be different in each country, based on the national culture.
3. As a further longer task (to be completed while or after studying Unit 4, Marketing (/study/app/business-hl/sid-351-cid-762729/book/the-big-picture-id-37435/), use the country comparison tool to identify two countries with very different cultural dimensions results. Briefly describe the results of each country and explain how the approach to **marketing** might be different in each country, based on the national culture.

Tool: Decision tree

Tool: Decision trees Tool: Decision trees Tool: Decision trees Tool: Decision trees

Section Student... (0/0) Feedback Print (/study/app/business-hl/sid-351-cid-762729/book/tool-decision-tree-id-39473/print/) Assign

A decision tree, also called a probability tree, is a tool that helps businesses make decisions by putting an estimated value on various options. It is particularly useful when a business needs to choose between investment decisions.

Student view

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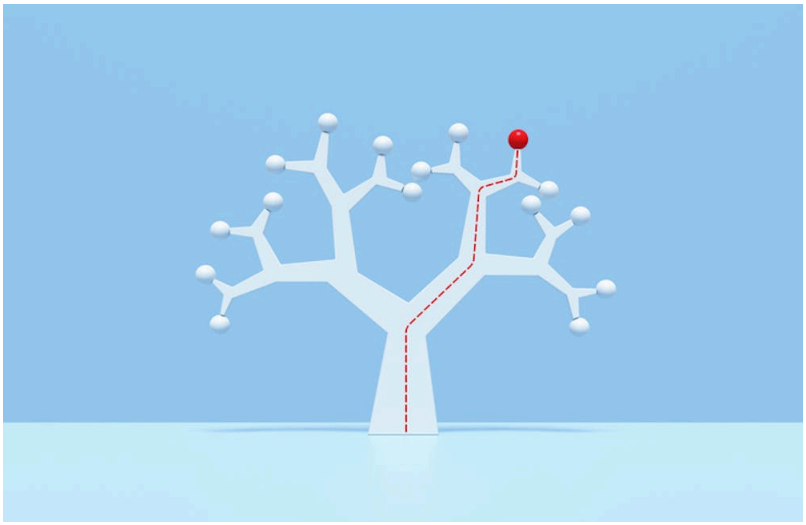

Figure 1. A decision tree enables a business to evaluate its alternatives.

Credit: Jorg Greuel, Getty Images

More information for figure 1

The image shows a stylized representation of a decision tree, typically used to evaluate business alternatives. It features a central trunk branching out into multiple smaller branches, each terminating in nodes. A particular path from the base to one of the upper nodes is highlighted in red, indicating a specific decision path. The background is a plain blue, emphasizing the white color of the tree structure. This diagram is a visual metaphor for decision-making processes, illustrating how different choices and their outcomes can be mapped. Although the tree appears abstract, it represents the branching nature of decision-making and the potential consequences of different paths.

[Generated by AI]

A decision tree is a quantitative, forward-looking tool. Decision trees are designed to answer questions such as, 'Given a 60% chance that a company can succeed in a new market, should it pursue its plans to expand its factory?' Decision trees are drawings that use particular elements, as shown in **Figure 2.**

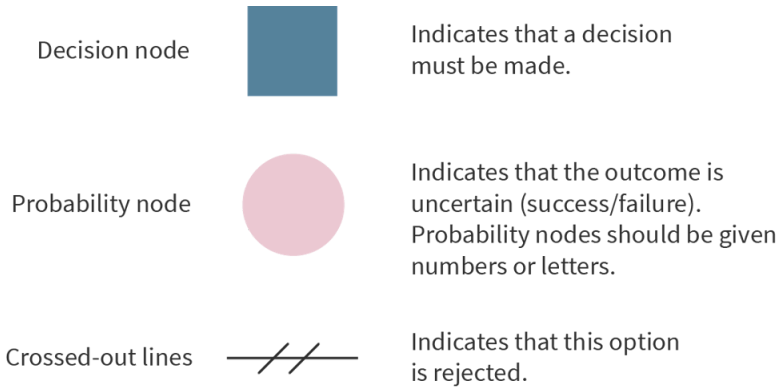

Figure 2. Elements of a decision tree.

Student view

More information for figure 2

The image is a diagram illustrating symbols used in decision trees. It contains three components:

1. A blue rectangle labeled "Decision node" with an explanation that it indicates a decision must be made.
2. A pink circle labeled "Probability node" with an explanation that it signifies an uncertain outcome (success or failure), and that these nodes should be labeled with numbers or letters.
3. Two crossed-out lines labeled "Crossed-out lines" with an explanation that it indicates this option is rejected.

[Generated by AI]

Exam tip

When drawing a decision tree in the exam, make sure you include a key that outlines the elements of the decision tree: the decision node, the probability node and the rejected options. It is usually not possible to earn full marks unless this key is included.

When you construct a decision tree, you need to do two things. The first is to draw the decision tree; the second is to solve the decision tree. Drawing and solving a decision tree are explained in the following example.

Drawing a decision tree

Imagine you run a business that manufactures machine components, and you decide to enter a new market. Based on research, the probability that the business will succeed in the new market is 60%, while the probability that it will not succeed in the new market is 40%. You need to decide whether or not to expand the factory. Such an expansion would enable you to meet possible new demand in the new market. Assume such an expansion to the factory would cost $10 million.

Start drawing a decision tree by representing your two options as separate lines extending to the right of the decision node (as shown in **Figure 3**). Option 1 is to expand the factory at a cost of $10 million. Option 2 is to leave the factory as it is and not to expand it. If the factory is not expanded, there will be no costs. The parentheses are used to indicate that these are negative numbers because they represent costs.

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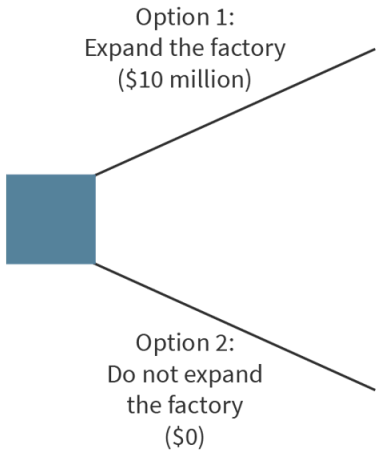

Figure 3. Drawing the first part of the decision tree to show the costs associated with the two options.

More information for figure 3

The image shows a decision tree representing two options from a decision node, depicted as a square. The first option extends to the right labeled "Option 1: Expand the factory ($10 million)", indicating the cost associated with expanding. The second option runs below the first, labeled "Option 2: Do not expand the factory ($0)", representing no cost if the factory remains unchanged. Each option extends as separate lines from the same decision node.

[Generated by AI]

Now that you have drawn your options, you need to add the probabilities of the two outcomes (success or failure in the new market). Start by adding probability nodes to the decision tree. These are shown by the two circles numbered 1 (for option 1) and 2 (for option 2) in **Figure 4**. The probabilities of the two outcomes should be written along the lines extending to the right of these probability nodes.

The chance of a particular outcome occurring is given a value. If the outcome is certain, the probability will be 1; if there is no chance of the outcome occurring, the probability will be zero. In practice, the values of the probabilities will be between 1 and zero. In this case, 0.6 equates to the 60% chance that the business is successful in entering the new market; 0.4 equates to the 40% chance that the business is not successful.

The probabilities that extend from each probability node always total 1 or 100%, because there is a 100% chance that something will happen. In this case, there will either be a success, or there will not be a success. Note that in this simple example there is only one uncertain event; this is why the probabilities extending from probability nodes 1 and 2 are the same. However, it could be that in more complex scenarios, with more options, the probabilities will be different for each option.

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

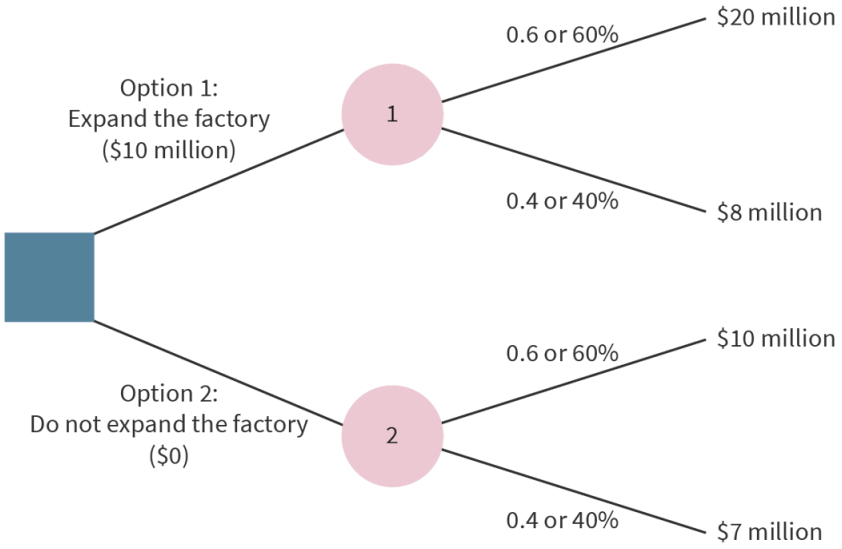

Figure 4. Drawing the second part of the decision tree to show the probabilities associated with each option.

More information for figure 4

The diagram is a decision tree with two main options branching out. Option 1 is "Expand the factory ($10 million)" leading to two probability nodes labeled 1 and 2. From node 1, there are two branches: one with a probability of 0.6 (or 60%), resulting in $20 million revenue, and another with a probability of 0.4 (or 40%), resulting in $8 million revenue. Option 2 is "Do not expand the factory ($0)" leading to node 2, which also has two branches: a 0.6 probability resulting in $10 million, and a 0.4 probability resulting in $7 million. The probabilities from each node total 100%, representing the certainty of an outcome occurring from each decision point.

[Generated by AI]

If you decide to expand the factory (option 1) and if the company is successful in the new market, it will be able to sell more components. As a result, the estimated revenues are $20 million over the life of the project. If you decide to expand the factory and the company is not successful in the new market, revenues earned by the enlarged factory will be lower, at $8 million.

If you decide not to expand the factory (option 2), the company will be unable to meet a higher level of demand. As a result, if the company is successful in the new market, the estimated revenues will only be $10 million. If the company is not successful with its current factory capacity, expected revenues would be $7 million.

All these expected revenues should be written at the end of the branches of the decision tree (as shown in **Figure 4**).

Student view

Overview (/study/app/business-hl/sid-351-cid-762729/o

Solving the decision tree

Once you have drawn the decision tree, you can calculate the expected value (EV) of expanding the factory compared to the expected value of not expanding the factory, given the uncertainty of the success. Solving the decision tree to find these expected values involves three steps, as follows:

Step A: Calculate the expected value (EV) of revenues from each possible outcome. The expected value of revenues is the estimated revenue multiplied by the probability that it will happen. It can be helpful to write the EVs at the end of the branches as shown in **Figure 5**.

Expected values for option 1 (expanding the factory):

- If successful: $0.6 \times \$20 \text{ million} = \$12.0 \text{ million}$
- If unsuccessful: $0.4 \times \$8 \text{ million} = \$3.2 \text{ million}$

Expected values for option 2 (**not** expanding the factory):

- If successful: $0.6 \times \$10 \text{ million} = \$6.0 \text{ million}$
- If unsuccessful: $0.4 \times \$7 \text{ million} = \$2.8 \text{ million}$

Step B: Calculate the **total** expected value of each of the two possible outcomes (success or not) for each option (expand the factory or not). It can be helpful to write the total expected value of each option above or below the probability node, as shown in **Figure 5**.

Total expected value for option 1 (expanding the factory):

- $\$12 \text{ million} + \$3.2 \text{ million} = \$15.2 \text{ million}$

Total expected values for option 2 (**not** expanding the factory):

- $\$6 \text{ million} + \$2.8 \text{ million} = \$8.8 \text{ million}$

Step C: Calculate the **net** expected value of each option by subtracting the initial costs. This number can be written next to the decision node, as in **Figure 5**.

Net expected value for option 1 (expanding the factory):

- $\$15.2 \text{ million} - \$10 \text{ million} = \$5.2 \text{ million}$

Student view

Net expected value for option 2 (**not** expanding the factory):

Overview (/study/ap hl/sid-351-cid-762729/o

- $8.8 million − $0 = $8.8 million

The completed tree will be as shown in **Figure 5**.

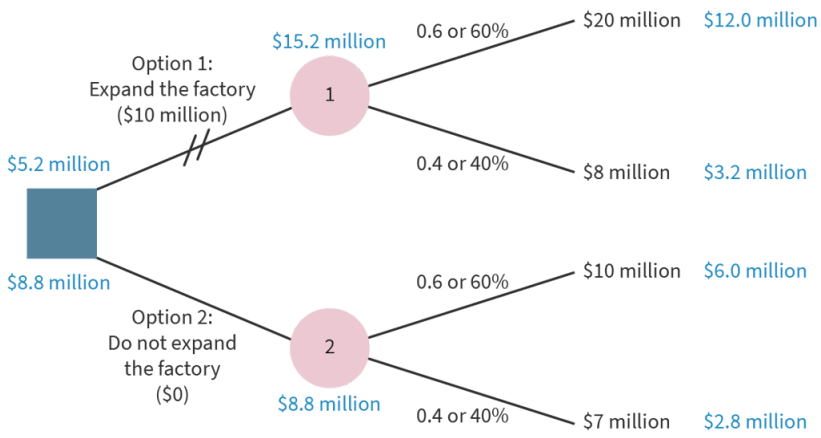

Figure 5. Solving the decision tree.

More information for figure 5

This is a decision tree diagram illustrating two main choices regarding factory expansion. The initial node splits into two options: Option 1, 'Expand the factory,' requires a $10 million investment, while Option 2, 'Do not expand the factory,' requires no additional cost. For each option, further decision paths with associated probabilities and outcomes are shown.

Option 1 leads to two outcomes: a 60% probability (0.6) of a $20 million outcome, resulting in a $12.0 million expected value, and a 40% probability (0.4) of an $8 million outcome, leading to a $3.2 million expected value.

Option 2 also leads to two outcomes: a 60% probability (0.6) of a $10 million outcome, producing a $6.0 million expected value, and a 40% probability (0.4) of a $7 million outcome, yielding a $2.8 million expected value.

These paths show the expected values depending on the calculated probabilities and forecasted profits, illustrating the potential outcomes of the factory expansion decision.

[Generated by AI]

The following equations summarise the calculations involved in solving the decision tree. EV stands for expected value, which is the predicted profit of each outcome given the expected probabilities and the forecast profits.

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

EV of expanding the factory net of costs

$$= (0.6 \times \$20 \text{ million}) + (0.4 \times \$8 \text{ million}) - \$10 \text{ million}$$

$$= \$5.2 \text{ million}$$

EV of not expanding the factory net of costs

$$= (0.6 \times \$10 \text{ million}) + (0.4 \times \$7 \text{ million}) - \$0$$

$$= \$8.8 \text{ million}$$

On purely estimated financial grounds, the factory should not be expanded, since the expected value of this option (option 2) is $8.8 million, while the expected value of expanding the factory (option 1) is only $5.2 million. The rational decision, based only on this quantitative data, is therefore not to expand the factory. The option to expand (option 1) is therefore the 'rejected option'; that line on the decision tree is therefore crossed out.

Exam tip

To access full marks, you are expected to write out the working, as above, in addition to providing the information on the decision tree.

Also, it is important to indicate the rejected option(s) on the decision tree.

Activity

The Doctrex laboratory has carried out research for new treatments for influenza. The researchers have identified three different programs (A, B and C) to develop a vaccination. The costs, probabilities and revenue of these programs are given in **Table 1**.

Table 1. Costs, probabilities and revenue of programs A, B and C.

Program	Costs (in thousands of $)	Probability of success	Revenue (in thousands of $)	Probability of failure	Re tho
A	2000	0.3	20 000	0.7	2
B	2600	0.4	17 000	0.6	4
C	1400	0.5	9000	0.5	5

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

1. Construct a fully labelled decision tree. [4 marks]
2. Calculate the expected value (EV) of the three programs and recommend an option to follow based on this information. [2 marks]

1. The decision tree should be drawn as follows:

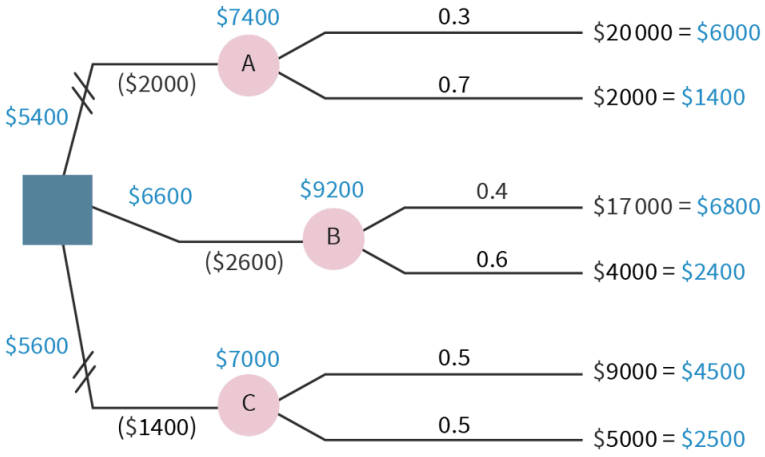

Figure 6. Decision tree for programs A, B and C (with figures in thousands of $)

2. The expected values of the three programs are:

EV of program A: (6000 + 1400) — 2000 = $5400 (thousand)
EV of program B: (6800 + 2400) — 2600 = $6600 (thousand)
EV of program C: (4500 + 1400) — 2000 = $5600 (thousand)

The best option, considering only the quantitative estimated value, is B because it has the largest estimated value at $6 600 000.

Solving more complex decision trees

Decision trees can be more complex than the example outlined in this section. A branch with a decision can lead to further decisions or probabilities with their own probabilities and branches, which might look like the diagram shown in **Figure 7**. **Figure 7** illustrates a complex decision tree that has an additional subset of decision nodes (indicated by the squares).

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

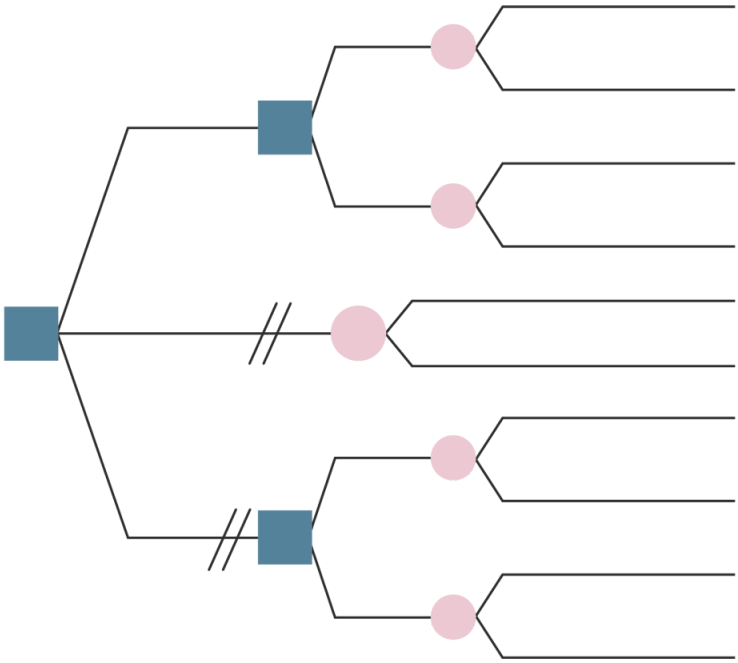

Figure 7. A more complex decision tree has additional nodes and branches.

More information for figure 7

The image depicts a complex decision tree diagram. It starts with a blue square node, expanding into three main branches. Each branch leads to further decision nodes represented by pink circles, some of which branch out again creating subsequent layers.

- The top branch from the initial blue node splits, leading to another blue square node, which then bifurcates into two more branches ending in pink circular nodes.
- The middle branch from the initial blue node narrows into a pink circle, then splits into two branches culminating in pink circular nodes.
- The bottom branch leads to a path where a blue square node splits into two paths that end in pink circles.

This diagram illustrates decision points and possible outcomes through its bifurcating structure, suggesting multiple pathways and scenarios.

[Generated by AI]

Solving these more complex decision trees is no different from solving the simpler version you have worked with until now. You would construct the decision tree with the decision nodes and branches from left to right. You would then solve the decision tree from right to left to determine the estimated values.

Student view

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It is also possible to put 'no change' on a decision tree branch. That way you can compare the results of various options to the revenues and costs associated with the current situation of the business.

Activity

Learner Profile: Knowledgeable
Approaches to Learning: Thinking skills (transfer)

Coffee Stop (CS) is a small cafe serving a variety of coffee drinks and healthy snacks. CS wants to increase its profits and is considering several options, as outlined below.

Option 1: Establish fair trade relationships with coffee farmers to better target ethical consumers.

Option 2: Buy a second coffee machine, that is either:

- **2a:** the same type of manual machine that the cafe currently owns
- **2b:** a new type of coffee machine that grinds and makes the coffee automatically, but still requires a person to operate

For both options 2a and 2b, the cafe would need to hire another employee, which would cost $75 000 over five years.

The probabilities, additional costs and additional revenues forecast for each option are given in **Table 2.** The costs and revenues are projected over a five-year period.

Table 2. Forecast additional costs, additional revenues and probabilities of each option for CS o five years.

Option	Forecast additional costs ($)	Forecast additional revenue if successful ($) (Probability 0.50)	Forecast addition revenue if not successful ($) (Probability 0.5(
Option 1 Establish fair trade relationships with coffee farmers.	18 000	32 000	20 000
Option 2a Buy the same type of coffee machine requiring manual operation.	4000	120 000	50 000
Option 2b Buy a new type of coffee machine that grinds and makes coffee automatically.	11 000	140 000	50 000

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Questions

1. Construct a fully labelled decision tree. [4 marks]
2. Calculate the expected value (EV) of the three options and recommend an option to follow based on this information. [2 marks]

Question 1

Construct a decision tree as shown in **Figure 8**.

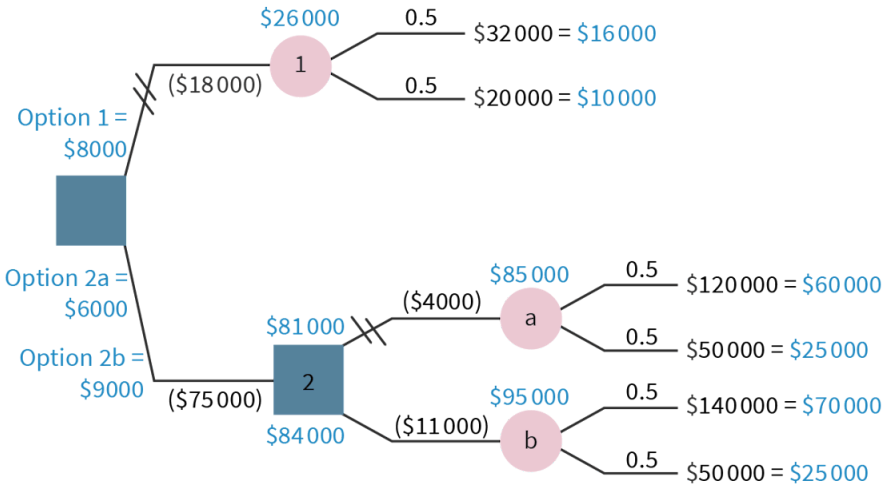

Figure 8. Decision tree for Coffee Stop.

Question 2

The expected values of the three programs are:

EV of option 1: (16 000 + 10 000) — 18 000 = $8000
EV of option 2a: (60 000 + 25 000) — 4000 — 75 000 = $6000
EV of option 2b: (70 000 + 25 000) — 11 000 — 75 000 = $9000

The best option, considering only the quantitative estimated value, is option 2b because it has the largest estimated value of $9000.

However, it is important to consider that there may be other, qualitative reasons for choosing a different option. For example, if CS is trying to improve its global—social and global—ecological impact, then it might choose option 1, even though that option has a lower estimated value.

In general, if the estimated values of the different options are close to one another, a business may be more likely to consider other qualitative factors in the decision.

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Evaluation of the decision tree tool

Table 3 outlines some of the advantages and disadvantages of using the decision tree tool for making business decisions.

Table 3. Advantages and disadvantages of the decision tree tool.

Advantages	Disadvantages
Visual representation. Provides a clear representation of complex problems, making the alternatives easier to understand and communicate.	**No qualitative factors.** Does not take qualitative factors into account.
Risk consideration. Allows for the integration of uncertainty (risk) into the analysis.	**Estimated values.** Probabilities used are only estimates, as are the projected revenues, and could lead to false results.
All options. Considers all available options, even the 'don't change' option, which is often ignored.	**Prone to bias.** The probabilities and the estimated figures for profit and loss might be prone to bias from the decision-maker, who may favour one option over another. This could lead to inaccurate results.

7. The business management toolkit / 7.1 The business management toolkit

Tool: BCG matrix

Tool: Boston Consulting Group (BCG) matrix Tool: Boston Consulting Group (BCG) matrix Tool: Boston Consulting Group (BCG) matrix Tool: Boston Consulting Group (BCG) matrix

Section Student... (0/0) Feedback Print (/study/app/business-hl/sid-351-cid-762729/book/tool-bcg-matrix-id-39209/print/) Assign

The Boston Consulting Group (BCG) matrix, also known as a growth-share matrix, is a tool that helps businesses that have multiple products to decide on their marketing strategies. Products are placed onto the matrix depending on two variables: market share and market growth.

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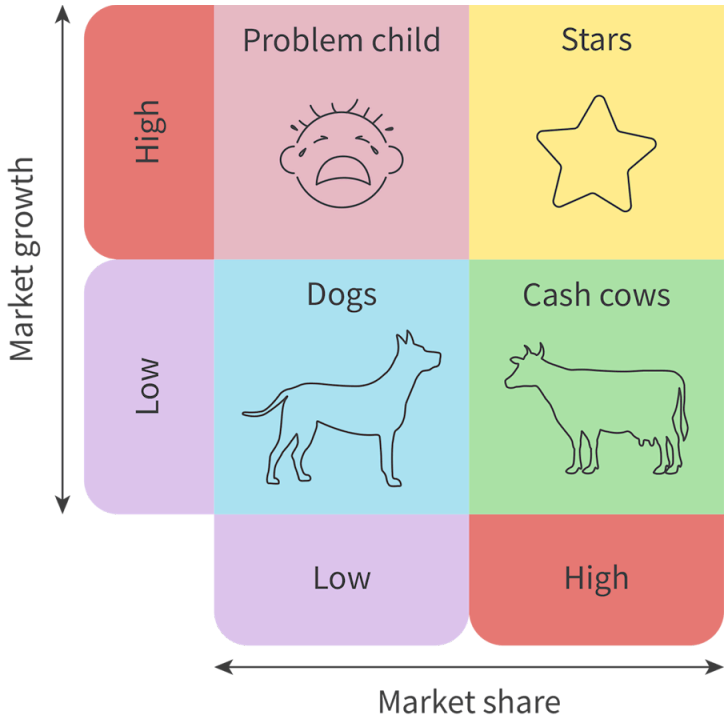

Figure 1. The Boston Consulting Group (BCG) matrix, also known as a growth-share matrix.

More information for figure 1

The image shows a Boston Consulting Group (BCG) matrix, also known as a growth-share matrix. It is a 2x2 grid that categorizes products based on market share (horizontal axis) and market growth (vertical axis).

1. **Problem Child (Question Marks):**
2. Located in the top-left quadrant.
3. Represents high market growth but low market share.
4. Depicted with a crying child icon.

5. **Stars:**

6. Located in the top-right quadrant.
7. Represents high market growth and high market share.
8. Depicted with a star icon.

9. **Dogs:**

10. Located in the bottom-left quadrant.
11. Represents low market growth and low market share.
12. Depicted with a dog icon.

13. **Cash Cows:**

14. Located in the bottom-right quadrant.

Student view

15. Represents high market share but low market growth.

16. Depicted with a cow icon.

The axes are labeled accordingly with "High" and "Low" to indicate the levels of market growth and market share.

[Generated by AI]

The BCG matrix can also serve as a reminder to businesses to build a diverse portfolio of products. Businesses may need a range of products that they can rely on for growth and for steady revenue streams. It is a good idea to have products that are earning large revenues, as well as products whose sales grow rapidly in growing markets. A business may also want to phase out products that are earning low revenues in markets that are not growing.

Products can be classified differently over time. When a product is first introduced in a market, it may have low market share and revenues in growing markets. Later, those products may gain market share in these strong markets. Eventually, products may again lose market share, or their market growth may decline. These stages are linked to a product life cycle, which will be discussed in Subtopic 4.5 (/study/app/business-hl/sid-351-cid-762729/book/the-big-picture-id-39004/).

Market share and market growth

In Section 4.1.4 (/study/app/business-hl/sid-351-cid-762729/book/market-share-and-leadership-id-37439/), you learned that market share is the percentage of total market sales controlled by a particular product. The formula for calculating market share is:

$$\text{Market share} = \frac{\text{number of units sold by the company}}{\text{total number of units sold in market}} \times 100 = \_\_\_\_\_ \%$$

For example, an electronics company sells $200 million worth of goods in a year. The entire industry sells $1000 million worth of goods in that same year. The company's market share is:

$$\text{Market share} = \frac{\$200 \text{ million}}{\$1000 \text{ million}} \times 100 = \_\_\_\_\_ \%$$

$$\text{Market share} = 20\%$$

Market growth refers to the total value or quantity of a particular good that is sold in a time period. The formula for calculating market growth is a simple percentage change:

$$\text{Market growth} = \frac{(\text{total market sales T2} - \text{total market sales T1})}{\text{total previous market sales T1}} \times 100 = \_\_\_\_\_ \%$$

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For example, an international clothing brand knows that the entire clothing market sales were $950 million in 2020 and $1000 million in 2021. It can then calculate the percentage growth of the market from 2020 to 2021 as follows:

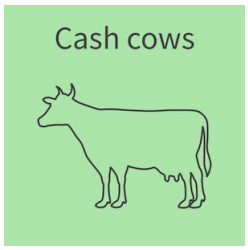
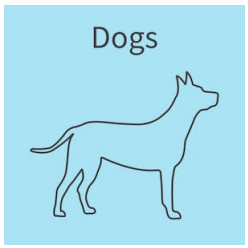
$$\text{Market growth} = \frac{(\$1000 \text{ million} - \$950 \text{ million})}{\$950 \text{ million}} \times 100 = \_\_\_\_\_ \%$$

$$\text{Market growth} = 5.26\%$$

Product classifications in the BCG matrix

Table 1 describes the product classifications in the BCG matrix.

Table 1. The product classifications in the Boston Consulting Group (BCG) matrix.

Type of product	Market share and market growth (high/low)	Description
	High market share. Low market growth.	Cash cows are successful products in mature, slower-growing markets. They earn high sales revenue from an established customer base. Customer loyalty is likely to be high. Therefore, less money is needed for marketing. Promotion is likely to focus on replacement products and maintaining loyalty.
	Low market share. Low market growth.	Dogs have low market share in low growth markets. These products may be at the end of their product life cycle (Section 4.5.1 (/study/app/business-hl/sid-351-cid-762729/book/product-life-cycle-id-39005/)), or perhaps they are niche products competing in mature low-growth markets.

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Type of product	Market share and market growth (high/low)	Description
	High market share. High market growth.	Stars are products that have a high market share in growing markets. Revenues should be growing strongly. Netflix can be considered a star product, as it is the market leader in the rapidly growing streaming market. This type of product also requires significant investment to sustain growth. Marketing will focus on attracting new customers and establishing a brand image. Profitability will depend on how much its revenue is reinvested in future growth. Certainly, high growth businesses will be spending heavily to keep expanding their operations and sales. Therefore, it is possible for a star to have a negative cash flow.
	Low market share. High market growth.	Problem children (also known as 'question marks') have low market share but operate in high growth markets. These products are often recently launched in response to the rapidly growing revenues of competitors. In the streaming market, Amazon's Prime or Hulu can be considered in this category. If they are to gain market share, considerable investment will be required. Therefore, they are likely to have a negative cash flow.

International Mindedness

The product categories in the BCG matrix use terminology that may not work well across all cultures. The matrix was developed by the Boston Consulting Group, an American management consulting firm. The matrix uses slang terminology that would be well-known in the United States, but which may mean something different in other countries.

However, the matrix can work without these categories because it is essentially a product position map with two axes referring to high and low market growth and high and low market share. You will learn more about product position maps in Section 4.2.2 (/study/app/business-hl/sid-351-cid-762729/book/segmentation-and-targeting-id-37445/).

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Student view

Activity

Learner profile: Inquirers
Approaches to learning: Research skills (information literacy); Thinking skills (critical thinking)

Look at the data on the number of users of messaging apps globally (https://www.messengerpeople.com/global-messenger-usage-statistics/) and then answer the following questions:

1. Assume that WhatsApp, Facebook Messenger, WeChat, QQ, Telegram and Snapchat are the most significant apps used globally in October 2021. Calculate the market share of each of these apps. (These will be approximations, because there are apps used that are not accounted for in these figures.)

2. Global figures can be misleading about market share in particular countries. Do some quick research to find out what the most popular messaging app is in your country. The source linked above has some specific country information.

3. At first glance, it may look as if there are several businesses with high market share in the messenger apps market. However, note also the following information:

- Facebook (now Meta) bought WhatsApp in 2014 for 19 billion USD.
- WeChat is not used widely outside China.

How might this further information change your interpretation of the data?

4. If you wanted to classify WhatsApp in the BCG matrix, what other information would you need to know?

1. If we assume that the top five apps account for all the users, the total market size is 6230 million (6.23 billion) users. (In reality the top five apps do not account for all the users, but we are using this assumption for the sake of practising market share calculations.)

The following calculations are in millions of users:

WhatsApp market share = (2000 ÷ 6230) x 100 = 32.1%

Facebook Messenger market share = (1300 ÷ 6230) x 100 = 20.9%

WeChat market share = 20.2%

QQ market share = 9.5%

Telegram market share = 8.8%

Snapchat = 8.6%

2. Answers will vary.

3. Meta (formerly Facebook) owns both WhatsApp and Facebook Messenger. This means that the global market share could be around 50% for Meta. Considering that WeChat is not used widely outside China, it would mean that, for many

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countries, Meta would monopolise the messenger app market with Messenger and WhatsApp.

4. If you wanted to classify the messenger apps in the BCG matrix, you would need to know how quickly the market for messenger apps is growing. Unfortunately, reliable data about the market growth for messenger apps is not easy to find outside of paid market reports.

Exam tip

If you are using the BCG matrix in your internal assessment, make sure you can justify your classification using data on market growth and market share. A gut feeling about where products would be positioned in the matrix is not enough.

Uses and limitations of the BCG matrix

The BCG matrix can be a useful framework for businesses to consider different strategies for different products in their portfolio. Businesses can identify which products may have the potential to earn the highest revenues. For example, stars in the matrix are doing well with high market share in growing markets. But to maintain the high market share in a growing market, the business may have to invest money in the product and be flexible to respond to increasing competition. The business can use the BCG matrix to guide some investment decisions.

Like all business management tools, you must use the BCG matrix carefully along with other methods of analysis to make judgements about a business. If you do not have clear data on a product's market share and market growth, your classification of products in the BCG matrix will be subjective. Even where you have data, the information does not consider other information about the external environment that can have an impact on the success of the product.

An example of this issue is the 'problem child' classification. Low market share in a high growth market could tell you that there is not a good product–market fit. But low market share in a high growth market can also occur when a product is newly introduced to a market. So some sources label the 'problem child' element of the BCG matrix as a question mark instead.

Another example is the 'dog' classification. A business might think that low market share in a low growth market means that the product should be phased out. However, there could be strong reasons to keep it in the portfolio, such as future market growth due to changes in the external environment. It is important to consider the product life cycle (Section 4.5.1 (/study/app/business-

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hl/sid-351-cid-762729/book/product-life-cycle-id-39005/)), the external environment and even the internal strengths and weaknesses of the business in order to understand the full context when making strategic decisions.

Tool: Gantt chart (HL)

Businesses are often engaged in project work. Projects involve a defined piece of work that has the following elements, which are also constraints:

- **Deliverable.** This is the end result of the project. It could be a tangible product, or it could be an intangible outcome such as a change to the organisation. Deliverables usually have required characteristics or qualities. These requirements are design constraints on the project outcome.
- **Time period.** A project has a time allocation with a beginning and an end. There may be rewards for staying within a time constraint or penalties for exceeding it. Internal customers in the business may also be relying on the completion of a certain project in order to do their own work.
- **Resources.** Physical, human and financial resources are required to complete a project. These can also place constraints on the project outcome by limiting the inputs.

All of these elements and constraints need to be planned and managed, which can be very difficult with a large, long-lasting, complex project.

A Gantt chart is a business management tool that illustrates a project plan. **Figure 1** shows a sample Gantt chart outlining the tasks involved in writing the IBDP Business Management internal assessment. The numbered columns represent the weeks of the project, where 1 is the first week, 2 is the second week, and so on.

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Business management internal assessment	1	2	3	4	5	6	7	8	9	10
Develop 2–3 research questions for teacher feedback or discussion. Include concepts, tools/theories and potential sources for the IA.	■	■								
Choose a topic.		■								
Prepare and maintain/edit a bibliography list of works cited.		■	■	■	■	■	■	■	■	■
Finish secondary research, and possibly primary research as well. Prepare supporting documents.		■	■	■						
Write an introduction and prepare an analysis outline for teacher feedback/discussion.				■	■					
Write an analysis and evaluation.					■	■				
Write a conclusion. Submit full first draft to teacher for feedback.							■			
Revise draft with teacher's feedback, proofread. Check in-text citations, bibliography, and supporting documents.									■	■
Submit final internal assessment.										■

Figure 1. A sample Gantt chart for the internal assessment project, showing the tasks to be completed over 10 weeks.

More information for figure 1

The image shows a Gantt chart titled "Business management internal assessment." It outlines several tasks associated with a business management project spanning over 10 weeks. The chart has one column listing tasks and ten columns labeled from 1 to 10, representing the weeks.

Tasks are as follows: 1. Develop 2—3 research questions for teacher feedback or discussion. Include concepts, tools/theories, and potential sources for the IA. Duration: Weeks 2—4. 2. Choose a topic. Duration: Week 2. 3. Prepare and maintain/edit a bibliography list of works cited. Duration: Weeks 1—10 (ongoing). 4. Finish secondary research, and possibly primary research as well. Prepare supporting documents. Duration: Weeks 4—6. 5. Write an introduction and prepare an analysis outline for teacher feedback/discussion. Duration: Weeks 5—7. 6. Write an analysis and evaluation. Duration: Weeks 6—8. 7. Write a conclusion. Submit full first draft to teacher for feedback. Duration: Week 9. 8. Revise draft with teacher's feedback, proofread. Check in-text citations, bibliography, and supporting documents. Duration: Weeks 9—10. 9. Submit final internal assessment. Duration: Week 10.

Shaded blue cells indicate the duration of each task across the corresponding weeks.

[Generated by AI]

As **Figure 1** shows, there are two main sections of a Gantt chart. The first column lists the tasks that need to be completed in the project. The other columns, at a minimum, capture information about how long each task will take. This could be in hours, days, weeks, months, or even years. In the case of the Gantt chart in **Figure 1**, you can see that some tasks may take one week, while others may take two weeks. The maintenance of the bibliography/works cited list would be ongoing during the entire project.

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Other information can also be included in a Gantt chart, such as:

- start and end dates
- people responsible for each task
- other resources needed, such as equipment and supplies
- information about whether one task is dependent on another
- milestones

Additional columns could be added for these to the Gantt chart between the tasks and time columns.

Gantt charts should be updated as work progresses. Often project tasks take longer than expected or outside resources may become unavailable. Updating the chart allows managers to continue to plan, share changes with a team and foresee potential difficulties before they arise. They can help keep a project on track and reduce expenses that come with delays.

You learned about the human errors in judgement that result in project delays and higher costs in the Theory of Knowledge box in Section 3.9.2 (/study/app/business-hl/sid-351-cid-762729/book/constructing-a-budget-id-39333/), which explains why project budgets are often exceeded.

Sometimes delays are caused by factors that cannot be controlled. In the process of housebuilding, for example, painting needs to be completed before the installation of heating units and kitchen cupboards. If the weather is rainy and humid, the paint will take longer to dry, so the project would be delayed. The project manager would then need to revise the Gantt chart.

Figure 2. Projects of all sizes, from writing an internal assessment to designing and constructing a building, can benefit from planning with a Gantt chart.

Credit: Kelvin Murray, Getty Images

Student view

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Like the other tools, the utility of the Gantt chart is limited by the accuracy of the information recorded in it. A chart based on unrealistic or imprecise expectations is not useful. **Table 1** outlines some benefits and limitations of Gantt charts.

Making connections

You can find editable online templates that can be used to make Gantt charts. These save a lot of time when you want to create a project plan. You can also download and use this Gantt Chart template in the Download Button below.

Download file (https://d3vrb2m3yrmyfi.cloudfront.net/media/edusys_2/content_uploads/Basic Gantt Chart Template.df05cb42ac867d8c4460.pdf)

Table 1. Benefits and limitations of Gantt charts as a business management tool.

Benefits of Gantt charts	Limitations of Gantt charts
Big picture. The chart succinctly captures entire projects, making it easier to plan the sequence of steps.	**Estimates may be wrong.** The chart relies on estimates of the time needed to complete the steps of a project, which may change because of dynamic internal or external factors.
Time estimates. The chart gives a better estimate of the time needed for a project, because overlapping tasks can be more easily visualised.	**Does not capture all information.** The chart does not capture all the information about a project, such as the size or complexity of the work involved.

Tool: Critical path analysis (HL)

Critical path analysis (CPA), also known as network analysis, is a project planning tool. It shows the critical path of a project, which is the minimum time period needed for the project to be completed. As with Gantt charts, critical path analysis can be used by project managers to gain an

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overview of:

- the tasks involved in a project
- how long each task is expected to take
- the order in which the tasks need to be done
- whether any tasks can be completed at the same time
- interim deadlines needed to keep the entire project on track
- whether any steps of the project have buffer time (also called a float time) in case of delays

This section is divided into several parts, to help you construct and interpret a network diagram and the critical path.

Exam tip

The IB Business Management syllabus states that you should be able to complete and analyse a critical path diagram, but that constructing a full critical path diagram is not expected.

Some activities in this section, however, ask you to construct a critical path. Practising this will ensure that you have a deep understanding of the structure and meaning of the numbers.

Critical path basics

Figure 1 shows a basic critical path (network) diagram for a fictional project – Project X – with some key components labelled. The letters in the diagram (A to F) represent the various tasks (or activities) of Project X. These are separated by circles, called nodes. The nodes represent the start and end of each task. Each node is divided into three parts, and you can number the nodes from left to right, for reference, using the left side of each node.

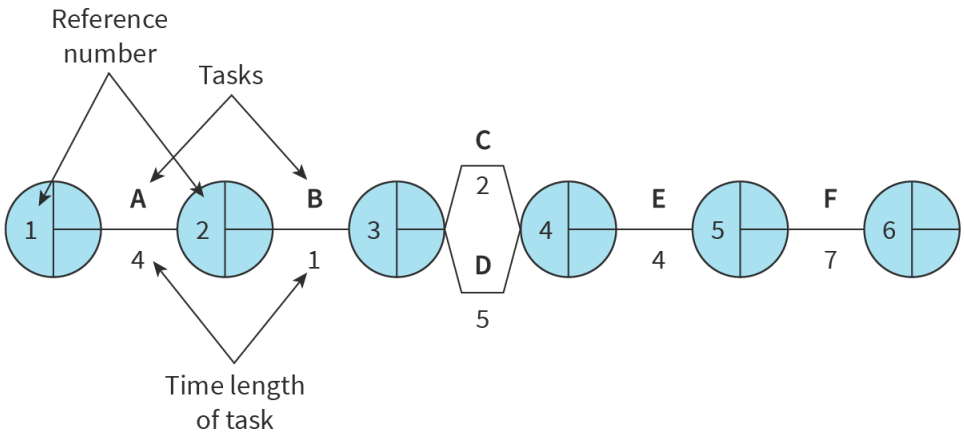

Figure 1. Critical path basics for Project X.

Student view

More information for figure 1

This diagram illustrates the basic critical path for a fictional project, Project X. It includes nodes and arrows representing tasks labeled from A to F. The nodes are circles divided into three parts with numbered references. The flow starts with node 1, leading to task A with a time length of 4, moving to node 2. From node 2, task B with a time length of 1 branches out, reaching node 3, then connecting to task C, which has a time length of 2, and task D, with a time length of 5. These tasks merge into node 4. From node 4, task E with a time length of 4 continues to node 5, and task F with a time length of 7 concludes at node 6. The numbering sequence helps in following the path of tasks, showing the start and end points of each task, forming a network diagram.

[Generated by AI]

So, in **Figure 1**, the first task is A and the final task is F. The node to the left of task A (labelled 1) represents the start of task A. And the node to the right of task F (labelled 6) represents the end of the task F.

You will learn about the other parts of the node later. However, because some activities will be happening concurrently, the reference numbers for the nodes do not necessarily represent the order in which the activities take place.

The number written below the line underneath each task represents the time period for that task. For Project X, the times are in days. So the time period for task A is four days, the time period for task B is one day, and so on. Two tasks in Project X – tasks C and D – are completed at the same time, each with different time periods; task C takes two days and task D takes five days.

The critical path diagram is drawn from left to right. However, the end node for the entire project cannot be drawn until you are sure that all the interim activities are accounted for.

Exam tip

You should take care when constructing a critical path (network) diagram for the practice work in this section.

Use a ruler to make straight lines that extend from the nodes at the midpoint. The lines should not cross one another.

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The information from **Figure 1** is summarised in **Table 1** below. In your exam, this is one way that you may be given information, from which you would be asked to draw a critical path (network) diagram.

Table 1. Summary of information for the critical path analysis (network diagram) for Project X.

Task	Preceded by	Duration (days)
A	--	4
B	A	1
C	B	2
D	B	5
E	C and D	4
F	E	7

Activity

Learner profile: Thinkers
Approaches to learning: Thinking skills (transfer)

Table 2 summarises the tasks involved in Project S, with their dependencies and durations. Use the information in the table to draw a simple critical path (network) diagram for Project S.

Table 2. Dependencies and duration of tasks for Project S.

Task	Preceded by	Duration (days)
A	--	2
B	A	3
C	A	7
D	B and C	1
E	D	5
F	E	4

Student view

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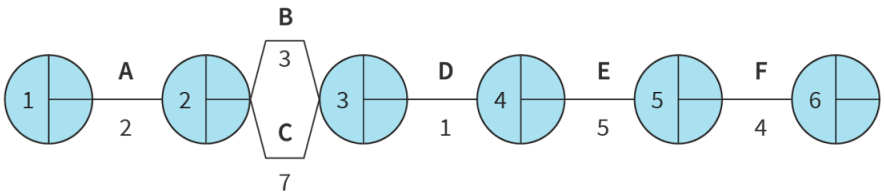

Critical path (network) diagram for Project S.

Adding earliest start time and latest finish time to the nodes

Once you have drawn the basic critical path (network) diagram, you can add information about the earliest start time and latest finish time to each node. This will allow you to understand the time constraints of the project more clearly.

Earliest start time (EST)

The earliest start time (EST) indicates the earliest time that a task can begin. It is written in the upper right segment of the node and refers to the task just after the node, as shown in **Figure 3**.

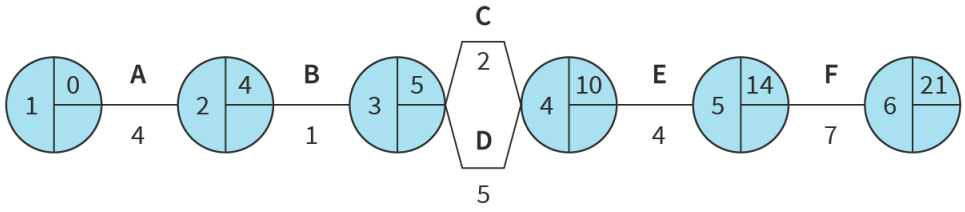

Figure 2. Adding earliest start times to the critical path (network) diagram for Project X.

More information for figure 2

The diagram shows a network diagram for Project X's critical path. The nodes are labeled with numbers representing tasks and the earliest start times. The nodes are connected with lines that show the sequence and duration of tasks. Starting from the left, the first node is labeled 1 with an earliest start time (EST) of 0. It is connected to node 2 with task A between them, and the duration is 4. Node 2 has an EST of 4.

Next, node 2 connects to node 3 with task B between them, with the duration 1, resulting in node 3 having an EST of 5. Node 3 connects simultaneously to node 4 labeled C and node 4 labeled D with tasks C and D between them. The duration for task C is 2 and for task D is 5. Node 4 with task C has an EST of 10.

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Node 4 with EST 10 connects to node 5 with task E and duration 4, leading to node 5 having an EST of 14. Finally, node 5 connects to node 6 with task F between them, the duration is 7, and node 6 has an EST of 21.

[Generated by AI]

Figure 3 shows that task A is the first task of Project X. It can start immediately, so 0 is written in the upper right segment of the node to the left of task A. Then, working from left to right you can see that:

- Task A will take four days to complete, so the earliest that task B can start is after day 4.
- Task B will take one day to complete. This means that tasks C and D can only start after day 5.
- Tasks C and D take different time periods and task E can only start after both task C and task D have been completed. In this case, you would select the higher of the two time durations for tasks C and D to insert as the earliest start time for task E. Thus, task E can only start after day 10.
- Task E takes four days to complete, so task F can only start after day 14.

The earliest start time for an activity is useful for businesses using just-in-time (JIT) strategies for lean production. Deliveries of resources can be planned to arrive just before the earliest start time for the activity that needs them. That way, storage costs for stock (inventory) can be reduced.

Latest finish time (LFT)

In **Figure 3**, the last node shows the end of Project X. The project should be completed in 21 days. This number is written in both the upper right and lower right segments of the last node. The lower right segment of the node refers to the latest finish time (LFT) that the preceding task should finish in order to keep Project X on track.

It is important to emphasise that the latest finish time (LFT) refers to the task to the **left** of the node. This is different from the earliest start time (EST), which always refers to the task to the **right** of the node.

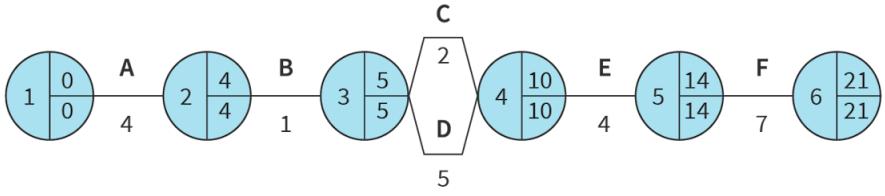

Figure 3. Adding latest finish times to the critical path (network) diagram for Project X.

More information for figure 3

Student view

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The image is a network diagram illustrating the critical path for Project X. It comprises six nodes labeled 1 through 6, each represented by a circle containing upper and lower numbers. These numbers show the earliest start times (upper numbers) and the latest finish times (lower numbers), which are split within each node.

- Node 1: Upper and lower numbers both 0.
- Node 2: Upper number 2, lower number 4.
- Node 3: Upper number 3, lower number 5.
- Node 4: Upper number 4, lower number 10.
- Node 5: Upper number 5, lower number 14.
- Node 6: Upper number 6, lower number 21.

Lines connect these nodes as follows: - Node 1 to 2 with task A, duration 4. - Node 2 to 3 with task B, duration 1. - Node 3 to 4 with tasks C and D, durations 2 and 5 respectively. - Node 4 to 5 with task E, duration 4. - Node 5 to 6 with task F, duration 7.

This diagram helps visualize the tasks' durations and the calculation of the critical path, highlighting the latest finish times on the left of each node.

[Generated by AI]

Now, this time working from right to left, you can insert the latest finish times to each of the previous nodes and see that (as shown in **Figure 3**):

- The project should be completed in 21 days. Task F takes seven days to complete, so the latest finish time for task E is day 14.
- Task E takes four days to complete, so the latest time for tasks C and D to be finished is day 10.
- Tasks C and D take different amounts of time to complete. In this case, you would subtract the larger of the numbers. So the latest finish time for task B is day 5.
- Task B takes one day to complete, so the latest finish time for task A is day 4.

In this simple critical path diagram for Project X, the earliest start times (EST) and the latest finish times (LFT) are the same in each node. In more complex critical path diagrams, this will not always be the case. You will look at a more complex example later in this section.

Activity

Learner profile: Thinkers
Approaches to learning: Thinking skills (transfer)

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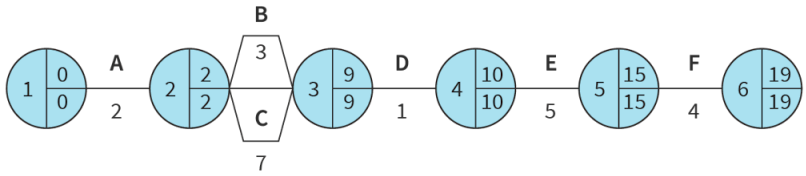
Table 3 is a repeat of **Table 2** from the previous activity, summarising the tasks for Project S with their dependencies and durations. Use the critical path (network) diagram that you have already completed and add in the earliest start times (EST) and latest finish times (LFT) for Project S.

Table 3. Dependencies and duration of tasks for Project S.

Task	Preceded by	Duration (days)
A	--	2
B	A	3
C	A	7
D	C	1
E	D	5
F	E	4



Critical path (network) diagram for Project S including earliest start times and latest finish times.

Calculating free float and total float

The float time refers to the amount of time that a task or activity can overrun its time estimate, but not disrupt the estimated time for the other tasks or for the entire project. There are two calculations for float: free float and total float.

Free float is the amount of time that a task can overrun its time estimate, but not delay the **next** task. It is calculated as follows:

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Free float of task Y = earliest start time (EST) of the next task – earliest start time (EST) of task Y – duration of task Y

Using the information from Project X, which is shown again in **Figure 4**, the free float for individual tasks can be calculated.

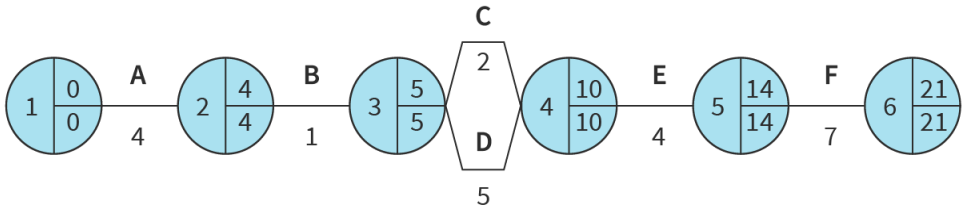

Figure 4. Critical path (network) diagram for Project X.

More information for figure 4

The image is a network diagram for Project X, displaying the sequence of tasks labeled from A to F. Each task is represented by numbers inside circles, connected by lines. The key tasks are as follows:\n\n- **Start Node (0)**: Location 1.\n- **Task A**: Connects nodes 0 to 2 with a duration of 4.\n- **Task B**: Connects nodes 2 to 3 with a duration of 1.\n- **Task C**: Connects nodes 3 to 4 with a duration of 2.\n- **Task D**: Connects nodes 3 to 4 with a duration of 5.\n- **Task E**: Connects nodes 4 to 5 with a duration of 4.\n- **Task F**: Connects nodes 5 to 6 with a duration of 7.\n\nThe diagram's flow illustrates the project's critical path, highlighting the relationships between tasks, their sequential order, and expected completion times. Numerical values inside the nodes indicate event numbers and times.

[Generated by AI]

Free float of task B = EST of task C – EST of task B – duration of task B

= 5 days – 4 days – 1 day

= 0 days

Task B has 0 days free float. It therefore cannot overrun its time estimate without delaying task C.

Free float of task C = EST of task E – EST of task C – duration of task C

= 10 days – 5 days – 2 days

= 3 days

Student view

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Task C has 3 days free float. It can therefore overrun its time estimate by three days without delaying task E.

Total float is the amount of time that a task or activity can overrun its time estimate, but not delay the **whole project**. It is calculated as follows:

Total float of task Y = latest finish time (LFT) of task Y – duration of task Y – earliest start time (EST) of task Y

Again, using the information from Project X, the total float for individual tasks can be calculated.

Total float of task E = LFT of task E – duration of task E – EST of task E

= 14 days – 10 days – 4 days

= 0 days

Task E has 0 days total float. This means that task E must finish on time or the entire project will be delayed.

Information about earliest start time (EST), latest finish time (LFT) and total float can be added to the information in **Table 1**. This information is included in **Table 4**. All tasks in Project X that have zero total float can then be identified. These tasks together are called the critical path because they must be completed on time. The critical path is also the minimum amount of time needed to complete the entire project. Note that, in **Table 4**, the total float is calculated using the following formula, with the subscript 'current task' indicating the current task being considered in the row:

$$\text{Total float} = \text{LFT}_{\text{current task}} - \text{EST}_{\text{current task}} - \text{duration}_{\text{current task}}$$

Table 4. Completed summary information for Project X.

Task	Preceded by	Duration (days)	EST	LFT	Total float (days)
A	--	4	0	4	4 — 0 — 4 = 0
B	A	1	4	5	5 — 4 — 1 = 0
C	B	2	5	10	10 — 5 — 2 = 3
D	B	5	5	10	10 — 5 — 5 = 0

Student view

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Task	Preceded by	Duration (days)	EST	LFT	Total float (days)
E	C and D	4	10	14	14 — 10 — 4 = 0
F	E	7	14	21	21 — 14 — 7 = 0

According to the total float figures, tasks A, B, D, E and F form the critical path. If any of these activities run over their time estimates, the entire project will be delayed. It is important that project managers pay particular attention to these activities to keep them on track.

When you are asked to identify the critical path in the exam, there are two ways of doing this. You can either write out the critical path with arrows or you can use hash marks (//) to indicate the critical path on the diagram itself. Both of these methods are shown in **Figure 5.** Note also the key indicating the elements of the critical path diagram.

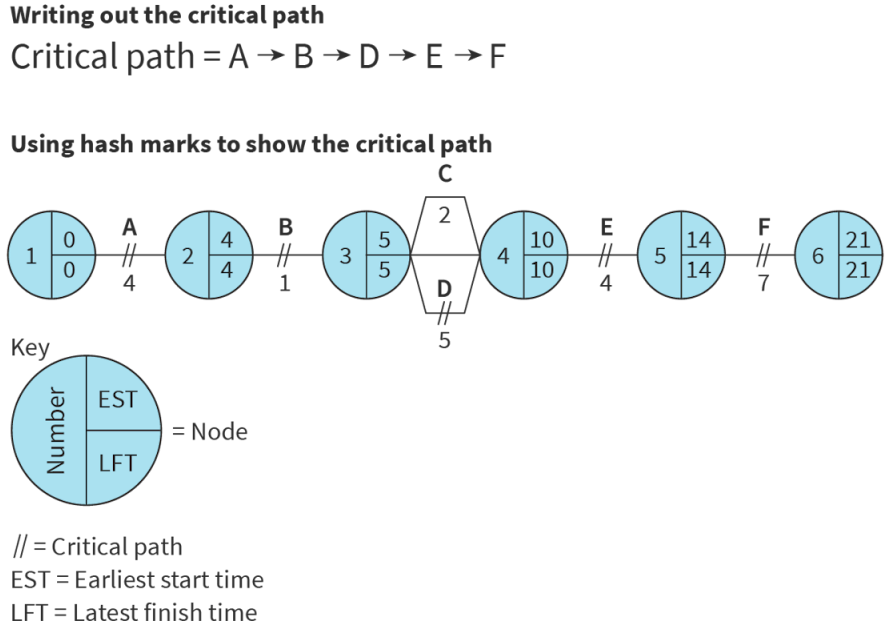

Figure 5. Two different ways of identifying the critical path for Project X.

More information for figure 5

The image contains two sections illustrating how to identify the critical path in a project. The top section, titled "Writing out the critical path," shows a straightforward list denoting the critical path as: A -> B -> D -> E -> F. The bottom section, "Using hash marks to show the critical path," features a series of labeled circular nodes connected by lines representing different components of the task sequence. Notable labels are 'A', 'B', 'D', 'E', and 'F.' Nodes contain numerical values indicating early start (EST) and late finish times (LFT) such as "(0, 0)", "(2, 4)", "(3, 5)" and so forth. Hashmarks (//) are depicted along the path of critical segments. A key is included showing: \="Critical path", EST="Earliest Start Time", LFT="Latest Finish Time". The structure visually combines node labels with critical path markers through the task sequence, aiding in identifying tasks' timing and sequence.

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Exam tip

You will likely be asked to identify the critical path in the exam. You must state the critical path explicitly or indicate it with hash marks on the diagram itself.

It is a good idea to double check your calculations. It can be very easy to mix up the EST and LFT for the current and next task when calculating free float and total float.

Complex critical path analysis

Until this point, you have been looking at a very simple critical path in order to learn the basics. In the exam, however, you will likely be given information for a more complex critical path analysis, such as the example given in **Figure 6** the following activity.

Activity

Learner profile: Thinkers
Approaches to learning: Thinking skills (transfer)

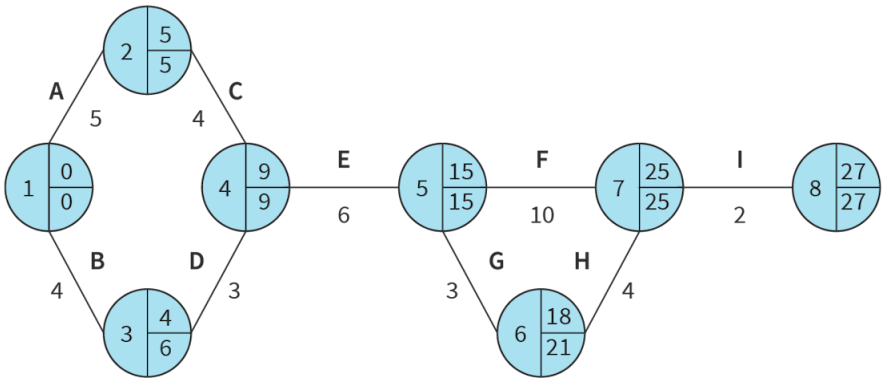

Figure 6. Critical path (network) diagram for Project Q.

More information for figure 6

This image is a network diagram used to illustrate the critical path of Project Q. The diagram contains several nodes labeled from A to I, each represented by a circle with split sections containing numbers. The nodes are connected by lines indicating paths between various nodes, with each path labeled with a number representing the length or duration. For instance, node A connects to B with a path labeled '4' and to C with '5'. Node C then connects to D and E with '4' and '9', respectively. From E, there is a path leading to F labeled '6'. Node F connects to H with a label '4' and to node G with '3'. Node H also leads to node I with a path labeled '2', which completes the network. The numbers within the nodes indicate possible timing values for project management. The diagram visualizes the flow and sequence of tasks required to complete Project Q, identifying critical tasks and paths.

[Generated by AI]

Student view

See if you can answer each question using the information from **Figure 6**. You can reveal the solutions to check your understanding.

Questions

1. What is the total number of days that Project Q should take?
2. What is the earliest start time (EST) for task F?
3. What is the latest finish time (LFT) for task D?
4. Create a table to show the tasks, task dependencies, task durations, earliest start times, latest finish times, free float and total float (you will have to calculate these).
5. Identify the critical path for Project Q.

Question 1

The total days for Project Q is 27. You can see this figure in the node at the **end** of the critical path (network) diagram.

Question 2

The earliest start time for task F is 15 days. This figure appears in the upper right segment of the node just **before** task F.

Question 3

The latest finish time for task D is 9 days. This figure appears in the bottom right segment of the node just **after** task D.

Question 4

Note that, in the table, free float and total float are calculated using the following formulas, with the subscript 'current task' indicating the current task being considered in the row and the subscript 'next task' indicating the next task.

$$\text{Free float} = \text{EST}_{\text{next task}} - \text{EST}_{\text{current task}} - \text{duration}_{\text{current task}}$$
$$\text{Total float} = \text{LFT}_{\text{current task}} - \text{EST}_{\text{current task}} - \text{duration}_{\text{current task}}$$

So, for example, in the first row the free float for task A is calculated as $\text{EST}_{\text{task C}} - \text{EST}_{\text{task A}} - \text{duration}_{\text{task A}}$.

Completed summary information for Project Q.

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Task	Preceded by	Duration (days)	EST	LFT	Free float (days)	To
A	-	5	0	5	5 — 0 — 5 = 0	5 —
B	-	4	0	6	4 — 0 — 4 = 0	6 —
C	A	4	5	9	9 — 5 — 4 = 0	9 —
D	B	3	4	9	9 — 4 — 3 = 2	9 —
E	C and D	6	9	15	15 — 9 — 6 = 0	15 -
F	E	10	15	25	25 — 15 — 10 = 0	25 -
G	E	3	15	21	18 — 15 — 3 = 0	21 –
H	G	4	18	25	25 — 18 — 4 = 3	25 -
I	F and H	2	25	27	27 — 25 — 2 = 0	27 –

Question 5

Critical path for Project Q = A → C → E → F → I

Exam tip

You may have noticed that — for tasks that are part of the critical path —the EST for the next task is the same as the LFT for the current task. This simply shows that the next task needs to start as soon as the previous task is finished; there is no float.

Student view

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Activity

Learner profile: Thinkers
Approaches to learning: Thinking skills (critical thinking, creative thinking)

Bee-have (BH) is a small workshop that makes beehives for beekeepers using scrap wood from a local building supply store. There are eight tasks involved in constructing the beehives at BH, some of which can be executed concurrently. The tasks, task dependencies and task durations in hours are shown in **Table 5**.

Table 5. Tasks needed to complete a beehive at BH.

Task	Preceded by	Duration (hours)	EST	LFT	Free float (hours)	Tota floa (hou
A	-	1				
B	-	6				
C	A	2				
D	A	4				
E	C	3				
F	E and D	2				
G	E and D	6				
H	G and B	1				

Questions

1. Construct a critical path (network) diagram for the completion of a beehive at BH.
2. State the minimum number of hours needed to make a beehive.
3. Copy and complete the table with the missing information.
4. Identify the critical path for the construction of a beehive at BH.

Question 1

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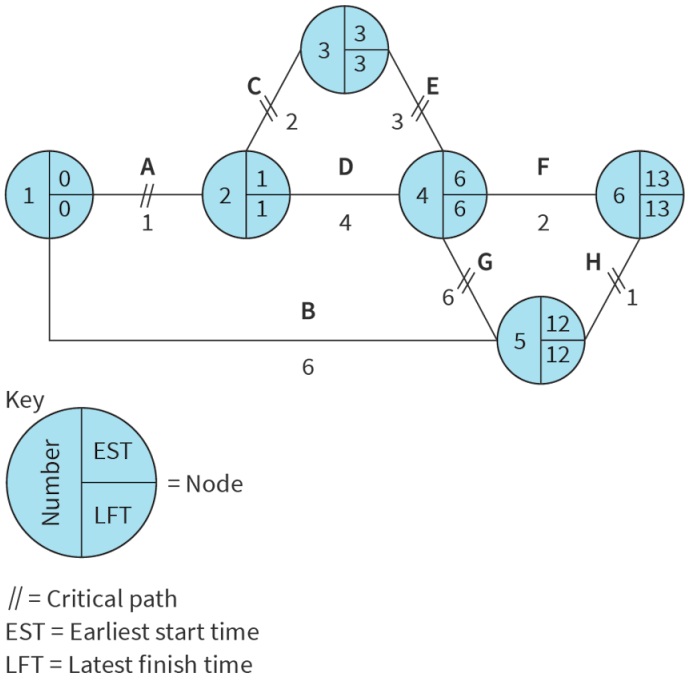

Critical path (network) diagram for BH's beehives.

Question 2

The minimum amount of time needed to make a beehive is 13 hours.

Question 3

The completed table should be as follows. As in the previous activity, free float and total float are calculated using the following formulas, with the subscript 'current task' indicating the current task being considered in the row and the subscript 'next task' indicating the next task.

$$\text{Free float} = \text{EST}_{\text{next task}} - \text{EST}_{\text{current task}} - \text{duration}_{\text{current task}}$$
$$\text{Total float} = \text{LFT}_{\text{current task}} - \text{EST}_{\text{current task}} - \text{duration}_{\text{current task}}$$

Tasks needed to complete a beehive at BH.

Task	Preceded by	Duration (hours)	EST	LFT	Free float (hours)	To
A	--	1	0	1	1 — 0 — 1 = 0	1 —
B	--	6	0	12	12 — 0 — 6 = 6	12 -
C	A	2	1	3	3 — 1 — 2 = 0	3 —

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Task	Preceded by	Duration (hours)	EST	LFT	Free float (hours)	To
D	A	4	1	6	6 — 1 — 4 = 1	6 —
E	C	3	3	6	6 — 3 — 3 = 0	6 —
F	E and D	2	6	13	13 — 6 — 2 = 5	13 -
G	E and D	6	12	12	12 — 6 — 6 = 0	12 -
H	G and B	1	13	13	13 — 12 — 1 = 0	13 -

Note that, in this case, the free float and total float have the same results. You should be aware, however, that this is not always the case. The results depend on the dependencies and where the free floats appear in the critical path (network) diagram.

Question 4

Critical path for construction of a beehive = A → C → E → G → H

Activity

Learner profile: Thinkers
Approaches to learning: Thinking skills (critical thinking, creative thinking)

You can really show a deep understanding of the critical path if you can create a problem yourself. Give it a try! Create a table of information about the tasks for a fictional project (Project R), their dependencies and their durations on a piece of paper and complete the critical path diagram for that information on the back of the piece of paper.

When you have done that:

- Swap your piece of paper with another student who has done the same and look at each other's tables.
- Each of you should create a critical path diagram from the other's table.
- Check your diagram against the other student's diagram. If there are discrepancies, see if you can resolve them to create fully aligned tables and diagrams.

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- If your entire class does this, ask your teacher if the class can create a booklet from the work to share for practice.

Dummy activities

In more complex critical path diagrams, you may see a dotted line indicating a dummy activity. A dummy activity has no duration or cost. It is added to the diagram simply to show the relationships between real tasks.

The critical path diagram in **Figure 7** includes a dummy activity to show that task C must be preceded by both tasks A and B. For simplicity, the ESTs and LSTs have been left out; only the node numbers and activity letters are included. In this example, the dummy activity indicates that:

- Task C must come after tasks A and B are finished.
- Task D must come after task B (but not task A).

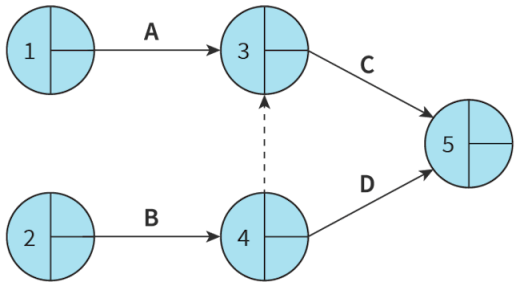

Figure 7. Critical path (network) diagram with a dummy activity included.

More information for figure 7

The image is a critical path network diagram showing the flow of activities between nodes labeled as 1, 2, 3, 4, and 5. Arrows indicate the direction of flow and are labeled with letters A, B, C, and D to signify different activity paths. Node 1 connects to node 3 via path A, node 2 connects to node 4 via path B. Node 3 has two connections, one a solid arrow leading to node 5 via path C, and another a dotted line connecting back to node 4. Finally, node 4 connects to node 5 via path D. The dotted line represents a dummy activity usually included in network diagrams to maintain correct sequence and logic without contributing to the project's timeline. The arrangement of nodes shows the various paths and dependencies to reach the final node 5, outlining a specific sequence and logic of the workflow.

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As noted in a previous exam tip, you will not be required to draw critical path diagrams or any dummy activities within them. However, if you see a dotted line in a critical path diagram in the exam, it is important that you know what it is.

7. The business management toolkit / 7.1 The business management toolkit

Tool: Porter's Generic Strategies (HL)

Tool: Porter's generic strategies (HL) Tool: Porter's generic strategies (HL)

Section Student... (0/0) Feedback Print (/study/app/business-hl/sid-351-cid-762729/book/tool-porters-gen-strat-id-39210/print/) Assign

Competitive advantage

Most businesses face competition from other businesses that offer the same or similar products to consumers. If there is more competition in a particular market, it is more difficult for a business to earn profits. Consumers will have many choices among products, so that any one company will likely earn lower revenues and profits.

Concept

Economic sustainability

Economic sustainability refers to the ability of a business to earn profits. Profits enable the business to continue operating because the profits can be used to make investments or adapt to the changing needs and wants of consumers.

Competition from other businesses offering the same products can result in lower profits for a business or can even lead to losses, which threaten the sustainability of the business. Sustaining business activity is important when businesses are providing for human needs, supporting the wellbeing of diverse stakeholders in the community and providing tax revenue to support public services and infrastructure.

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Figure 1. Does your product stand out in a competitive market?

Credit: Richard Drury, Getty Images

In highly competitive markets, businesses will look for a competitive advantage over other businesses offering the same product. A competitive advantage is a condition in the business that enables it to offer better products, or products at lower production cost, than its rivals. If a business can offer better products, then consumers may choose those products over others offered by competing businesses. As a result, revenues and profits may rise. And if a business can produce the product with lower costs, then profits may also increase.

Exam tip

For students taking IBDP Economics, it is important not to confuse the business concept of competitive advantage with the economics concept of comparative advantage.

Competitive advantage in the IBDP Business Management course refers to a situation where a business is able to offer better or lower-cost products in a market.

Comparative advantage in the IBDP Economics course refers to a situation where a country or economy is able to produce a product at a lower opportunity cost.

Strategies

Michael Porter, a professor and researcher of competition theory, developed a matrix of four general strategies to help businesses consider how to respond to their external competitive environment. Porter's Generic Strategies matrix (see **Figure 2**) considers two broad competitive

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strategies: lower cost or differentiation. Differentiation means that a business has made its product different or better than its rival's product. The matrix also considers whether a business is targeting a broad market of consumers or a narrow niche market.

The Generic Strategies mix can apply to both for-profit commercial and for-profit social enterprises. A description of each strategy is given below in **Figure 2**.

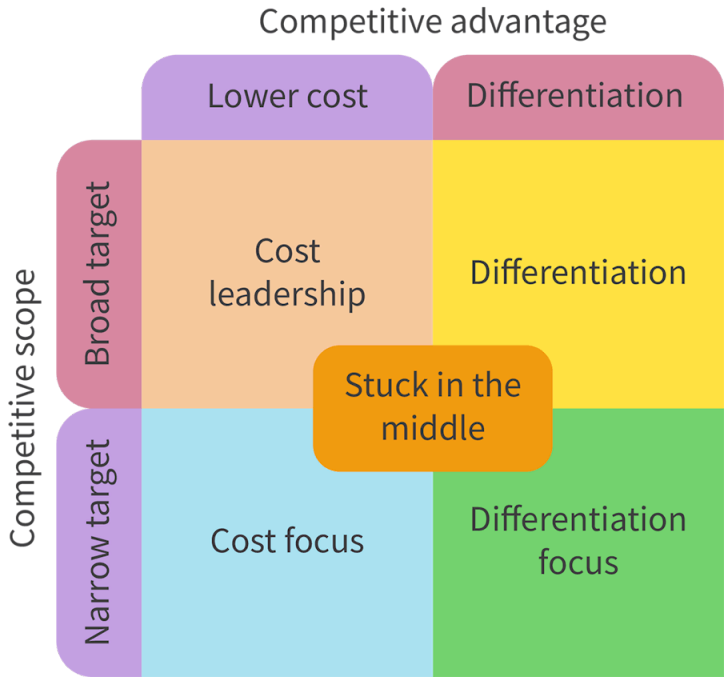

Figure 2. Porter's Generic Strategies.

Source: Adapted from Porter 1980, Competitive Strategy.

More information for figure 2

The image is a diagram representing Porter's Generic Strategies model. It consists of a square divided into four quadrants, each representing a different strategy. The left side of the square is labeled "Lower cost" and the right side "Differentiation." The top is labeled "Broad target" and the bottom "Narrow target."

The quadrants are arranged as follows: - Top-left quadrant is labeled "Cost leadership," indicating a strategy focusing on offering products at the lowest cost across a broad market. - Top-right quadrant is labeled "Differentiation," indicating offering unique products targeting a broad market. - Bottom-left quadrant is labeled "Cost focus," indicating offering low-cost products aimed at niche markets. - Bottom-right quadrant is labeled "Differentiation focus," indicating offering unique products tailored to niche markets.

In the center, a label "Stuck in the middle" indicates businesses that have no clear strategic direction. This diagram visually represents strategic options based on cost and market focus differentiation.

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The cost leadership and differentiation strategies apply to businesses that are selling their products to a broad target market. A broad target market is a large group of people with different characteristics and preferences, likely in a wide geographical range.

Cost leadership

A cost leadership strategy means that the business becomes the low-cost producer in the industry. If the business is very large, it may reduce unit costs of production through various economies of scale (Section 1.5.2 (/study/app/business-hl/sid-351-cid-762729/book/internal-and-ext-economies-id-36534/)). The business may also reduce unit costs of production through specialised technologies or more efficient supply chains.

A cost leadership strategy is most suited to a market where the products are standardised and there is less opportunity to differentiate through product quality, branding or promotion. An example of a company that uses a cost leadership strategy is Bic which is best known for its inexpensive, robust pens and markers. However, the company also makes shavers and lighters. Its small range and economies of scale keep costs of production low as it serves a broad market.

Figure 3. Cost leadership is an appropriate strategy for a business that produces products that are hard to differentiate.

Credit: Fabio Magni / EyeEm, Getty Images

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Differentiation

A differentiation strategy means that a business is able to make its product better or different from competitors in the industry. The business will usually identify a special characteristic of the product – its unique selling point (USP) – and aim to make the product the best in the industry on that point. As you learned in Section 4.2.4 (/study/app/business-hl/sid-351-cid-762729/book/product-differentiation-and-usp-id-37447/), products can have a unique selling point in any of the seven Ps: product, price, place, promotion, people, processes or physical evidence.

For example, you learned in Section 4.2.0 (/study/app/business-hl/sid-351-cid-762729/book/the-big-picture-id-37443/) that the Columbian for-profit social enterprise Crepes and Waffles was able to differentiate itself in a broad market. Its food products found a gap in the market. Its hiring practices, which focused on women who are heads of households, meant that it had a unique selling point through its people. The business has grown over time and now has outlets in many countries.

If it is successful, the business should sell more products and could even charge a premium price, both of which will increase revenues. Profits may also increase, but only if the business keeps the production and promotion costs related to the differentiation under control.

Figure 4. Differentiation allows a business to make its product better or different from competitors in an industry.

Credit: Peter Dazeley, Getty Images

The next two strategies focus on a smaller market segment called a niche market. A niche market is a small part of a larger market. In niche markets, customers have very specialised needs or wants that are different from the larger market.

Student view

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Cost focus (niche market)

A cost focus strategy means that the business becomes the low-cost producer in a niche market. A business that is pursuing a cost focus strategy will usually be producing a product that is relatively basic, perhaps a lower-cost copy of a popular and higher-priced product. An example of this could be a career coach who offers low-cost online coaching and support services for people looking to enter a particular field. In-person career coaching can be quite expensive, but if a coach can develop a range of services at lower cost, the coach could also charge lower prices to customers.

Differentiation focus (niche market)

A differentiation focus strategy means that the business is producing a specialised, or differentiated, product for a niche market. The differentiation could be that the product is very high quality, that it is very exclusive or that it provides some kind of special characteristic that the niche market wants. A shoemaker who makes custom shoes for clients would be an example.

A business must understand the needs and wants of the niche market very well for this strategy to work. The business should be able to charge premium prices to increase revenues and compensate for the small market size.

Figure 5. Differentiation focus means to offer a specialised product, such as very large shoes, to a niche market.

Credit: Holly Wilmeth, Getty Images

Student view

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Stuck in the middle

A business is ‘stuck in the middle’ when it is not differentiated enough to convince consumers to buy its product. Also its costs of production, and likely its prices, are too high relative to those of competitors. These businesses are probably earning low profits or may be experiencing losses.

Businesses that are stuck in the middle need to change strategies. To increase profits, they need to either cut costs of production, or they need to work on differentiating themselves. They also need to determine whether they are focused on a broad or narrow market. Confusion about the scope of the market can also make marketing strategies unclear.

Activity

Learner profile: Knowledgeable
Approaches to learning: Thinking skills (transfer)

Consider a business and a product with which you are familiar. This could be a widely known product from a multinational company, or it could be something produced locally. If you are attending a school that charges fees and faces competition, you could select that business.

- What strategy does the business seem to be using to compete with its rivals? Identify an appropriate strategy and use evidence from your experience and observations to support your ideas.
- If you think the business is ‘stuck in the middle’, what change in strategy may be best for the business to improve its profits and become more economically sustainable?

Tool: Contribution (HL)

Tool: Contribution (HL) Tool: Contribution (HL)

Section Student... (0/0) Feedback Print (/study/app/business-hl/sid-351-cid-762729/book/tool-contribution-hl-id-39660/print/) Assign

In Section 5.5.1 (/study/app/business-hl/sid-351-cid-762729/book/calculating-breakeven-id-39496/), you learned about the concept of contribution per unit (undefined)contribution per unit (undefined). The contribution per unit is the amount of money left after the variable costs per unit have been subtracted from the price per unit. Total contribution is the sum of these contributions at a certain quantity (output).

Student view

As a reminder, the formulas for contribution are:

$$\text{Contribution per unit} = \text{price per unit} - \text{variable cost per unit}$$

$$\text{Total contribution (at a certain quantity)} = \text{contribution per unit} \times \text{quantity (output)}$$

Exam tip

Remember that contribution is not the same as profit. Contribution is calculated as price minus variable costs. In order to calculate profit, fixed costs must also be taken from the sales revenue.

Uses of contribution calculations

There are several ways in which contribution calculations can be used in business:

Determining the break-event point

As you learned in Section 5.5.1 (/study/app/business-hl/sid-351-cid-762729/book/calculating-breakeven-id-39496/), contribution calculations enable a business to determine the break-even point. To reach the break-even point, a business must cover its fixed costs with the contributions. Thus, the formula for break-even is:

$$\text{Break-even quantity} = \frac{\text{fixed costs}}{\text{contribution per unit}}$$

Choosing work (orders)

Another use for contribution calculations is to help a business choose what work to take on, or which orders to accept. Generally, where a business has more work or orders than it can take on, the business should choose the work or orders that have the largest contribution value.

For example, Méndez Ltd manufactures chairs and tables and has received two orders. One order is for the production of 1000 chairs; the other order is for the production of 800 tables. However, Méndez Ltd only has the resources to accept one order so the company needs to decide which order to accept. **Table 1** shows the estimated revenue and cost details.

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Figure 1. Should Méndez Ltd accept an order for making chairs or tables?

Credit: Jordan Lye, Getty Images

Table 1. Revenue and cost comparison for an order for producing chairs or tables for Méndez Ltd.

	Chairs ($)	Tables ($)
Sales revenue	12 000	17 000
Variable costs	8900	15 400
Contribution	3100	1600

Following the calculation, and considering that only one order can be accepted, the business should accept the order of chairs, since the contribution of the chair ($3100) is larger than the contribution of the tables ($1600).

Make or buy analysis

Businesses often have a choice of whether to produce a product or component themselves, or to outsource the production to a third party. To make this decision, they need to consider both qualitative and quantitative factors. Keeping the work in-house allows for closer quality controls and overall management of the production process. On the other hand, using subcontractors helps companies deal with fluctuations in demand.

Contribution plays a role in the quantitative analysis of the make or buy decision. A business needs to be careful to consider the revenues and costs involved with the decision. When dealing with products that make a contribution to fixed costs, a business will need to consider contribution in the make or buy decision; if the business chooses to buy rather than make, then the contributions of the product will be ‘lost’ and will need to be made up by other product lines.

Student view

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Allocating direct and indirect costs for contribution calculations

In Subtopic 3.3 (/study/app/business-hl/sid-351-cid-762729/book/the-big-picture-id-39300/), you learned about costs and revenues and about the distinction between direct costs and indirect costs.

Direct costs are those that can only be attributed to a single part of the business – that is, directly linked to the sale of the goods or the provision of the service. Examples include the resource costs for a particular product, operations costs for a particular department, utility costs of a single branch of a chain store, and so on.

Direct costs are relatively easy to allocate for the purposes of calculating contribution. They are clearly associated with a particular product or department. However, indirect costs are not easy to allocate. Indirect costs involve a number of business activities that support the business as a whole, such as nationwide advertising campaigns, salaries of the board of directors, IT costs, and so on. It is difficult to determine how to allocate these indirect costs when calculating the contribution for a particular product.

A business has the following options when dealing with indirect costs for contribution calculations:

- contribution costing
- absorption costing

Contribution costing

Contribution costing involves using costs to support decision-making that only considers the direct costs of the product, department or region and their contribution to the indirect costs of the business as a whole. For example, if Méndez Ltd produced chairs, tables and bed frames, the business could calculate the contribution for each product line, as shown in **Table 2**. These contributions combined would cover the indirect costs for the entire business, in this case, $1 000 000.

Table 2. Contributions for various furniture products at Méndez Ltd.

	Chairs ($)	Tables ($)	Bed frames ($)
Total revenue	1 500 000	2 000 000	2 300 000
Total direct costs	750 000	1 200 000	1 500 000

Student view

	Chairs ($)	Tables ($)	Bed frames ($)
Contribution	750 000	800 000	800 000

Total contribution for all products = $750 000 + $800 000 + $800 000 = $2 350 000

Indirect costs = $1 000 000

Profits = $1 350 000

Using contribution costing, it seems that tables and bed frames are contributing more to the overall profit than chairs for Méndez Ltd.

Absorption costing

Absorption costing (undefined)Absorption costing (undefined) involves dividing the indirect costs among the products, departments or regions based on predetermined criteria such as output, sales revenue, number of employees, or the value of the equipment. The indirect costs would be allocated proportionally based on the differences between the products, departments or regions. This provides a more accurate picture of the various contributions to a business's profits. However, it is more complex to calculate.

Again, using the example of Méndez Ltd, the indirect costs were $1 million. Examine the information in **Table 3** below to consider two ways that the business could use absorption costing to allocate these indirect costs.

Table 3. Data on sales revenue and employees at Méndez Ltd.

Product	Sales revenue ($ millions)	% of total sales revenue	Employees	% of total employees
Chairs	1 500 000	26	3	30
Tables	2 000 000	34	4	40
Bed frames	2 300 000	40	3	30

If Méndez Ltd decided to allocate the $1 million indirect costs to the different products based on the relative sales revenues of each product in the third column, then the indirect costs would be allocated as follows:

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Indirect costs for chairs = $1 000 000 × 0.26 = $260 000
Indirect costs for tables = $1 000 000 × 0.34 = $340 000
Indirect costs for bed frames = $1 000 000 × 0.40 = $400 000

With this information, it is now possible to determine the profits earned by each product rather than just the contribution as was done in **Table 2**. The new calculations that include indirect costs are in **Table 4** below.

Table 4. Profits earned by each product at Méndez Ltd using the absorption costing method for indirect costs based on relative sales revenue.

	Chairs ($)	Tables ($)	Bed frames ($)
Total revenue	1 500 000	2 000 000	2 300 000
Total direct costs	750 000	1 200 000	1 500 000
Allocated indirect costs	260 000	340 000	400 000
Profit	490 000	460 000	400 000

Notice that the total profit for producing chairs, tables and bed frames is still $1 350 000. In **Table 2**, where contribution costing was used, it looked like tables and chairs were making the largest contribution to covering the indirect costs. However, using absorption costing based on relative sales revenue, the data shows that chairs are making the largest contribution to the profits of Méndez Ltd. This might have an influence on how the business makes decisions on allocating financial, human or physical resources moving forward.

However, using different absorption costing criteria, Méndez Ltd may see a different outcome. If Méndez Ltd decided to allocate the $1 million indirect costs to the different products based on the percentage of employees, then the indirect costs would be allocated as below:

Indirect costs for chairs = $1 000 000 × 0.30 = $300 000
Indirect costs for tables = $1 000 000 ×0.40 = $400 000
Indirect costs for bed frames = $1 000 000 × 0.30 = $300 000

You can see the impact of this allocation of indirect costs in the profit calculations in **Table 5**.

Table 5. Profits earned by each product at Méndez Ltd using the absorption costing method for indirect costs based on relative number of employees.

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

	Chairs ($)	Tables ($)	Bed frames ($)
Total revenue	1 500 000	2 000 000	2 300 000
Total direct costs	750 000	1 200 000	1 500 000
Allocated indirect costs	300 000	400 000	300 000
Profit	450 000	400 000	500 000

Notice that the total profit for producing chairs, tables and bed frames is still $1 350 000. In **Table 4**, where the relative sales revenue was used to allocate costs, it looked as though chairs were contributing the most to profit. However, using absorption costing based on relative employees, the data shows that bed frames are contributing the most to the profits of Méndez Ltd. Again, this might have an influence on how the business makes decisions on allocating financial, human or physical resources moving forward.

Evaluation of contribution analysis

You have already been introduced to a number of uses of the contribution tool. **Table 6** also outlines some limitations.

Table 6. Uses and limitations of contribution analysis for business decision-making.

Uses of contribution analysis	Limitations of contribution analysis
Break-even. Contribution calculations are part of the break-even analysis that is needed to determine the viability of a business.	**Assumptions.** Contribution analysis is based on many assumptions about conditions in the internal and external environment, and how indirect costs may be integrated. If assumptions change, the result of the contribution analysis may be different. The calculations might also change depending on the time period used.
Choosing work (orders). When a business has more work or orders than it can take on, it should choose the work or orders that have the largest contribution value.	**Only one tool among many.** Contribution analysis is a valuable quantitative tool, but it is only one of many tools for decision-making. Businesses should consider both quantitative and qualitative information, including ethics concerns.
Make or buy. Contribution analysis is a quantitative tool used to determine whether a business should make or buy a product or component.	

Student view

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Activity

Consider the following information about Company Z, which comprises two centres (Centre A and Centre B).

Centre A

Price of product: $120
Quantity sold: 1500
Variable costs: 50% of the price

Centre B

Price of product: $130
Quantity sold: 1350
Variable costs per unit: $80

Indirect costs of Company Z: $20 000

Questions

1. Calculate the total contribution for Centre A and Centre B separately.
2. Calculate the total profits for Company Z.
3. Assume that Company Z decides to use absorption costing to get a more accurate picture of the contribution of each centre. It decides to allocate indirect costs as follows: Centre A 80% and Centre B 20%. Calculate the profits earned by Centre A and Centre B separately using absorption costing. Double check your work by confirming that the sum of these two profits equals the profit you calculated in question 2.
4. Comment on the different results for questions 1 and 3.

Question 1

Centre A
Contribution per unit = price — variable cost
= $120 — $60
= $60

Total contribution = contribution per unit x quantity

= $60 x 1500
= $90 000

Centre B

Contribution per unit = price — variable cost
= $130 — $80
= $50

Student view

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Total contribution = contribution per unit x quantity
= $50 x 1350
= $67 500

Question 2

Profit for Company Z = total revenue — total costs
= $355 000 — $218 000
= $137 000

The interim calculations are as follows:

Total revenue = price x quantity
Total revenue for Centre A = $120 x 1500 = $180 000
Total revenue for Centre B = $130 x 1350 = $175 000
Total revenue for Company Z = $355 000

Total variable costs = variable costs x quantity
Total variable costs for Centre A = $60 x 1500 = $90 000
Total variable costs for Centre B = $80 x 1350 = $108 000
Total variable costs for Company Z = $198 000

Total indirect costs for Company Z = $20 000
Total costs for Company Z = $198 000 + $20 000 = $218 000

Question 3

Indirect costs for Centre A = $20 000 x 0.80 = $16 000
Indirect costs for Centre B = $20 000 x 0.20 = $4 000

Profit for Centre A = total revenue Center A — total costs Center A
= $180 000 — ($90 000 + 16 000)
= $74 000

Profit for Centre B = total revenue — total costs
= $175 000 — ($108 000 + 4 000)
= $63 000

Question 4

When only the variable costs are considered to calculate contribution for Centre A and B, Centre A appears to contribute $90 000 to Company Z's profit, while Centre B appears to contribute $67 500. However, when absorption costing is used to allocate indirect costs, the difference between the Centre A and Centre B declines significantly. This reveals the role and importance of the assumptions and data used to calculate contribution.

Student view

Tool: Simple linear regression (HL)

What is linear regression analysis?

Imagine that you are the national sales manager of a clothing business and you are trying to predict next month's sales figures. There might be several factors that can impact your predictions, from changes in the weather to competitors' marketing strategies, or unforeseen events such as COVID-19.

Simple linear regression analysis provides a mathematical way to sort out the possible factors that might impact future sales, or other elements of a business. Regression models describe the relationship between two variables by fitting a line of best fit. The simple linear regression tool allows businesses to estimate how a dependent variable changes as the independent variable changes.

Simple linear regression can also be used to analyse how effective the marketing strategies of some businesses have been. For example, the analysis can show to what extent the spending on marketing has been successful in generating sales.

Features of simple linear regression include:

- The dependent variable: the main factor that the business is trying to predict. For example, the dependent variable could be monthly sales.
- The independent variable: the factor that the business suspects has an impact on its dependent variable (for example, monthly sales).

Simple linear regression involves the following steps:

1. Creating scatter diagrams to plot data from two variables.
2. Sketching a line of best fit.
3. Extrapolating the data to make predictions.

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Scatter diagrams

A scatter diagram is a special type of graph designed to show the relationship between two variables. With simple regression analysis, you can use a scatter diagram to see if the data given in terms of X and Y are linearly related.

Example: Suppose Business A wants to know the relationship between its online advertising costs (spending) and its e-commerce sales. The business has been able to get the survey results from its seven online stores for the last year. **Table 1** represents the survey results from the seven online stores.

Table 1. Business A's online advertising costs versus monthly e-commerce sales (in thousands of $), showing a positive relationship.

Online stores for Business A	Online advertising costs (in thousands of $)	Monthly e-commerce sales (in thousands of $)
1	1.9	379
2	1.6	335
3	2.4	595
4	4.5	785
5	1.5	350
6	2.7	525
7	1.1	310

From the table above, it can be seen that there is a positive correlation between the online advertising costs and monthly e-commerce sales. In simple terms this means that, as the value of the independent variable (advertising costs) increases, the value of the dependent variable (e-commerce sales) also increases. With this data, the business can predict that, as the advertising costs increase, so do the monthly e-commerce sales.

Using the information from **Table 1**, the following scatter diagram can be made with advertising costs plotted on the *x*-axis and monthly e-commerce sales plotted on the *y*-axis.

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

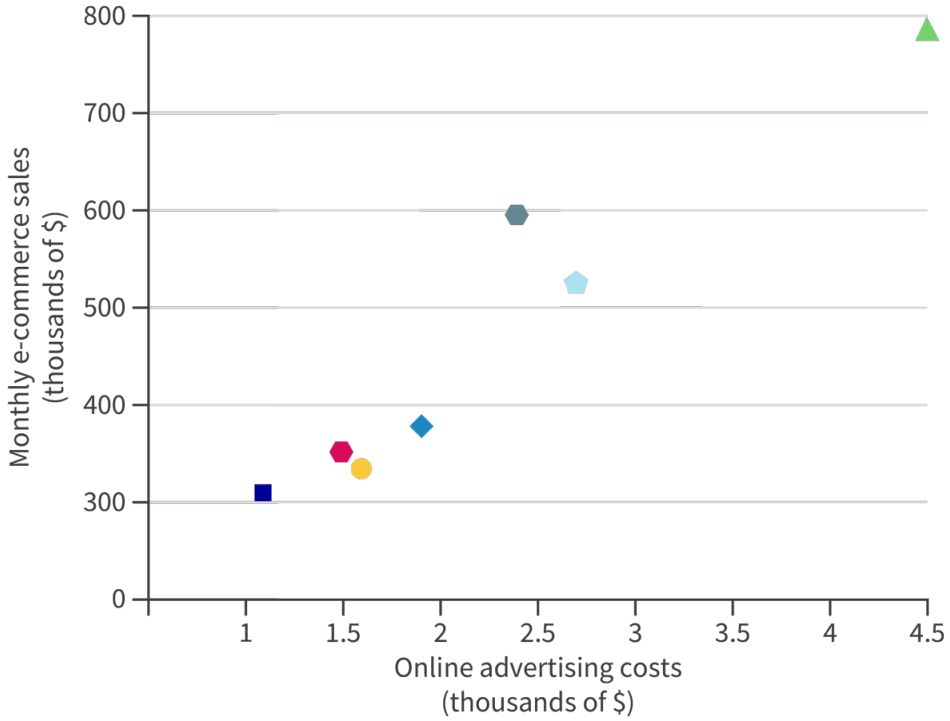

Figure 1. A scatter diagram showing data from advertising costs and e-commerce sales.

More information for figure 1

The scatter diagram shows the relationship between online advertising costs and monthly e-commerce sales. The X-axis represents online advertising costs, labeled in thousands of dollars, with a range from 0 to 4.5. The Y-axis represents monthly e-commerce sales, also in thousands of dollars, with a range from 300 to 800. Several data points are scattered across the graph:

1. At approximately $1,000 in advertising costs, sales are around $300,000.
2. At $1,500 in costs, sales slightly increase to about $330,000.
3. At $2,000, sales are around $400,000.
4. At approximately $3,500 in costs, sales rise to around $600,000.
5. Finally, at $4,500 in costs, sales peak at around $780,000.

Overall, the trend shows an upward trajectory where increased advertising costs correlate with higher e-commerce sales.

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A scatter diagram has both benefits and limitations, as shown in **Table 2.**

Table 2. The benefits and limitations of scatter diagrams.

Student view

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Benefits of a scatter diagram	Limitations of a scatter diagram
Scatter diagrams are easy to plot. A scatter diagram depicts the relationship between two variables, which is good for visual learners. Scatter diagrams show non-linear patterns with ease. It is easy to observe and interpret the pattern depicted in a scatter diagram. Maximum and minimum values are easily determined in a scatter diagram.	Scatter diagrams cannot give you the exact extent of correlation. A scatter diagram cannot take more than two variables into account. Only relationships between two variables can be illustrated. A scatter diagram only depicts quantitative data and cannot reflect qualitative data.

Line of best fit

A scatter diagram shows all the relationships between individual pieces of data for the independent and dependent variables. However, to be useful, a business needs to find a general relationship between the variables that can be used for predictions. A line of best fit will express this general relationship.

The line of best fit is a line through a scatter plot of data that captures the relationship between the independent and dependent variables. The line of best fit should be sketched in a way that is closest to the most number of points in the scatter diagram. It goes roughly through the middle of all the points on the scatter diagram.

To make the line of best fit even more accurate, it is important that you draw the line through a point that represents the mean of the independent data and the mean of the dependent data. Also, if possible, a roughly equal number of points should be above and below the line of best fit.

In **Figure 2** below, the same data from **Table 1** has been used. The diagonal line is the line of best fit, which is also called a line of regression. It illustrates the predicted relationship between each possible value of advertising costs and e-commerce sales.

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

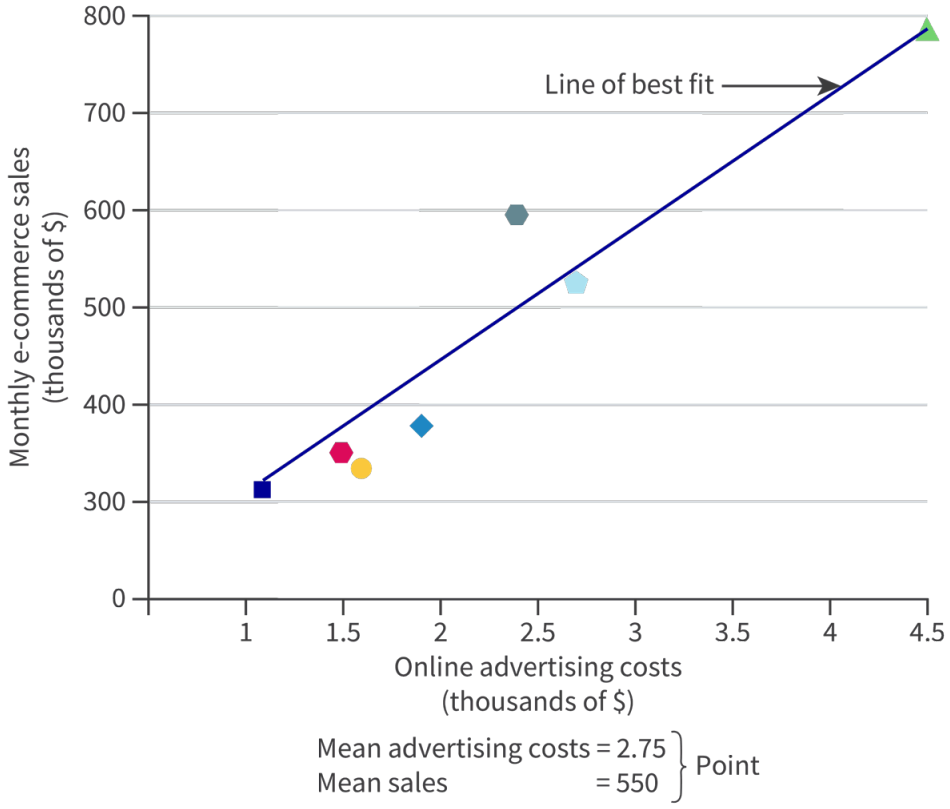


Figure 2. Line of best fit showing the relationship between advertising costs and e-commerce sales.

More information for figure 2

The image is a graph depicting the relationship between online advertising costs in thousands of dollars and monthly e-commerce sales in thousands of dollars. The X-axis represents online advertising costs ranging from 1 to 4.5 thousand dollars, while the Y-axis represents monthly e-commerce sales ranging from 300 to 800 thousand dollars.

A line of best fit runs diagonally across the graph, indicating a positive linear relationship; as advertising costs increase, so do sales. Several data points are plotted on the graph at various positions. Notably, the graph includes a mean advertising cost of 2.75 thousand dollars and a mean sales value of 550 thousand dollars. These means are labeled on the graph, providing a reference for understanding data distribution. Points of different shapes and colors are used to signify various data sets or categories, highlighting their respective positions in relation to both axes and the line of best fit.

[Generated by AI]

Now take the same example of advertising and e-commerce sales, but with data that shows a negative relationship between the two variables. This could be because the advertising is ineffective or is turning customers off. **Table 3** represents the survey results from the seven online stores.

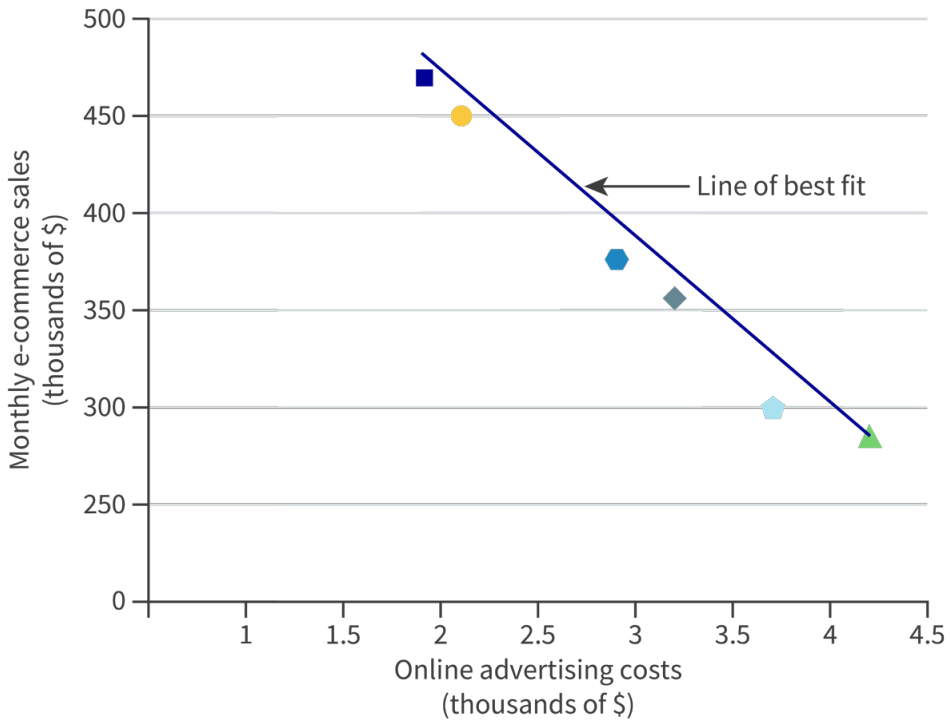
Student view

Overview (/study/ap hl/sid-351-cid-762729/o

Table 3. Online advertising costs versus monthly e-commerce sales (in thousands of $), showing a negative relationship.

Online stores for business A	Online advertising costs (in thousands of $)	Monthly e-commerce sales (in thousands of $)
1	1.9	468
2	2.1	450
3	2.9	375
4	3.2	355
5	3.7	300
6	4.2	285
7	4.5	250

From the table above, it can be seen that there is a negative correlation between the online advertising costs (x-axis) and monthly e-commerce sales (y-axis). In simple terms, this means that as the value of the independent variable (advertising costs) increases, the value of the dependent variable (e-commerce sales) decreases. With this data, the business can predict that, as the advertising costs increase, the predicted monthly e-commerce sales decrease.



Student view

Overview (/study/app/hl/sid-351-cid-762729/o

Figure 3. Line of best fit diagram.

More information for figure 3

The image is a scatter plot graph depicting the relationship between online advertising costs and monthly e-commerce sales. The X-axis represents online advertising costs in thousands of dollars, ranging from 0 to 4.5. The Y-axis represents monthly e-commerce sales in thousands of dollars, ranging from 250 to 500. The plot includes several data points, each represented by different colored and shaped markers, showing individual data values on the graph.

A blue line of best fit runs diagonally across the graph from the top-left to the bottom-right, indicating a negative correlation between advertising costs and e-commerce sales. At the bottom of the graph, it notes: "Mean advertising costs = 3.2 (thousand)" and "Mean sales = 355 (thousand)," providing statistical context to the data presented. The graph is labeled as a "Line of best fit diagram," as seen in the visual.

[Generated by AI]

Activity

SaniaR is a fast fashion clothing retailer. It delivers a new range of clothing every two weeks in its over 1500 stores worldwide. SaniaR's unique selling point is the rapid changes to its clothing lines, achieved by launching new styles every two weeks. The company's sales depend on the number of different styles they launch every two weeks — the greater the number of styles, the greater the sales. Of course, introducing new lines of clothing affects costs of production.

Table 4 shows the relationship between SaniaR's production and marketing costs and their monthly sales. (The table uses fictional data for the purpose of understanding.)

1. Draw a scatter diagram with the line of best fit to illustrate the information given in **Table 4**. [2 marks]
2. Explain whether there is a positive or negative correlation between the two variables. [2 marks]

Table 4. SaniaR's production and marketing costs versus mean monthly sales per year.

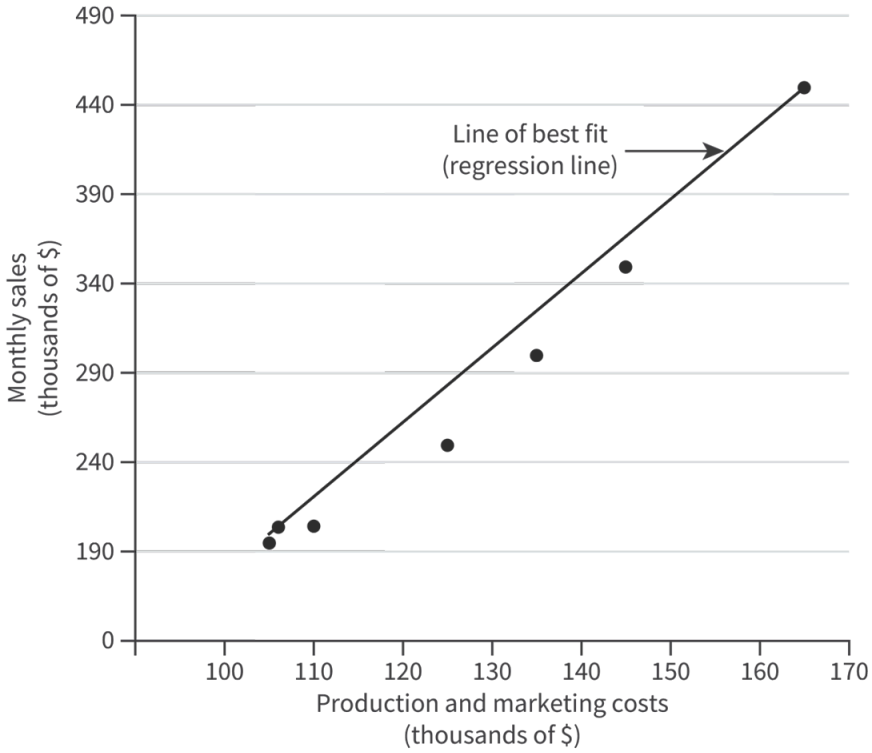
Year	Production and marketing costs (in thousands of $)	Monthly sales (in thousands of $)
1	105	195
2	110	205

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

Year	Production and marketing costs (in thousands of $)	Monthly sales (in thousands of $)
3	106	204
4	125	250
5	135	300
6	145	350
7	165	450

1. The following scatter diagram should be drawn.



2. There is a positive correlation between both the variables. As production and marketing costs (independent variable) increase, the sales (dependent variable) increase.

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

Exam tip

In an exam question, your sketch of a line of best fit will not be precise. Thus, examiners will be instructed to accept reasonable attempts at drawing the line of best fit.

However, you must make sure to find the mean of the data for the independent and dependent variables, and make sure your line goes through that point. This is required to access full marks in exam questions asking for the line of best fit.

Video 1. Using scatter plots to describe relationships between two variables, and using lines of best fit to make predictions.

Time series analysis: moving averages

In Section 4.3.1 (/study/app/business-hl/sid-351-cid-762729/book/sales-forecasting-id-38738/), you learned that sales data can vary over time quite significantly. When this happens, it can be difficult to see the overall trend and to draw the line of best fit. So it is important to smooth out the data by finding the mean of groups of data. Calculating a moving average can help you do that.

Analysing data using the trend analysis of time series data enables a business to understand a number of things. A trend is a pattern over time. Firstly, the business can know the trend of the sales it is making – in other words – whether this is rising or falling over time. Secondly, the business can understand any seasonal fluctuations. This is important for businesses that sell seasonal products such as ice creams, holidays or clothing. Thirdly, the business can pay attention to any cyclical fluctuations. This means those fluctuations that are the result of economic growth or recession in the broader economy.

Student view

Overview (/study/app/hl/sid-351-cid-762729/o

The easiest way to understand this concept is by using an example. Imagine a business that specialises in selling second-hand cars. The business has a number of loyal customers, who on average replace their cars once every three years.

Step 1: Calculate the three-year moving average

The second-hand car business is thinking of expanding. However, it will only be profitable for it to do so if forecast sales for 2022 are above 100 cars a year. **Table 5** shows the company's sales figures and moving average for the last nine years. A moving average attempts to 'smooth out' any peaks or troughs in sales data so that underlying trends in data can be seen. Sales data goes through a three-year cycle. A three-part moving average can therefore be used. The three-year moving average is calculated in **Table 5**.

Table 5. Annual car sales from 2011 to 2022.

Year	Car sales	Three-part moving average (trend)
2011	34	
2012	110	80
2013	96	83
2014	43	85
2015	116	86
2016	99	88
2017	49	90
2018	122	91
2019	102	93
2020	?	94
2021	?	96
2022	?	98

The three-part moving average is calculated using a mean. For example, the first figure of 80 was calculated by taking the average of the sales figures from 2011, 2012 and 2013 as follows:

Student view

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$$\text{Three-part moving average} = \frac{(34+110+96)}{3} = 80$$

Each figure for the three-part moving average is then graphed. This shows the overall trend, smoothing out the extreme variations in the data. This is shown graphically in **Figure 4**.

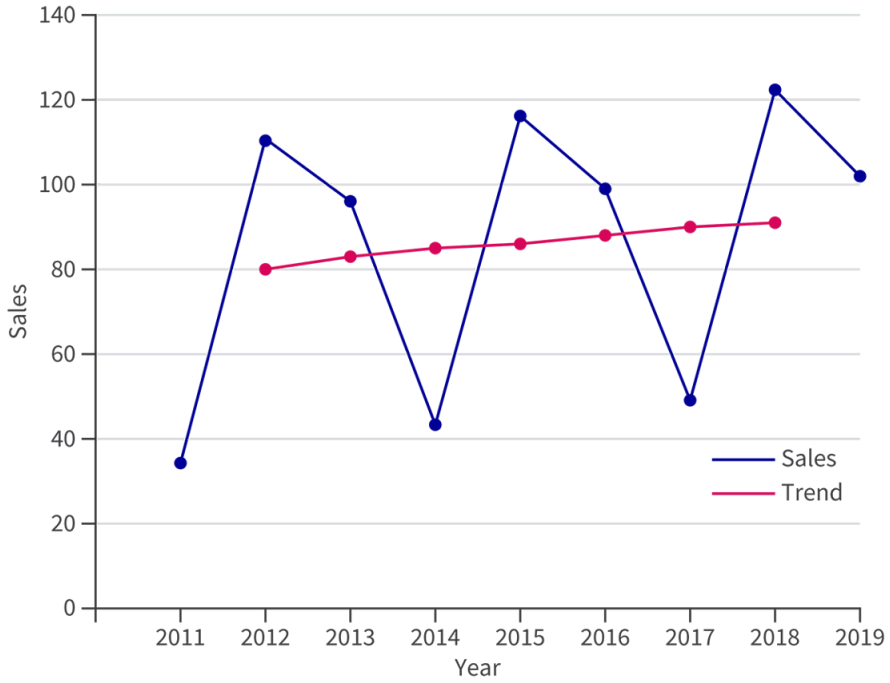


Figure 4. Three-part moving average $= \frac{(34+110+96)}{3} = 80$

More information for figure 4

The image is a graph illustrating the concept of a three-part moving average. The X-axis likely represents time units, while the Y-axis shows values such as production or consumption levels over that period. The graph consists of two jagged lines; one is dark blue and represents individual data points, and the other is a smoother red line, representing the calculated moving average over the same period. The blue line fluctuates more sharply, indicating variability in the data, while the red line appears more stable, showing the mean average trend. The graph suggests the use of a moving average to smooth out short-term fluctuations and highlight longer-term trends or cycles in the data.

[Generated by AI]

Step 2: Extrapolate the trend

Extrapolation of the trend is a forecasting method used by businesses to identify trends using past data, and extending this information and trend to be able to predict what future sales might look like.

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

Extrapolation is useful if the correlation between the two sets of data is clear, such as sales revenue over a period of time. Smoothing out the data using the three-point moving average (as above) helps make the overall trend in the data clearer. However, the data representing the three-point moving average is still not linear. To make a prediction into the future, a line of best fit needs to be added, as was done with the scatter diagram earlier in this section.

From the example in **Figure 4**, a line of best fit can be added and extended to predict future sales. In **Figure 5**, the line of best fit has been added and extrapolated (extended) out as far as 2022.

As was mentioned earlier in this section, it is important that the line of best fit goes through the mean values of both the time data and the sales data.

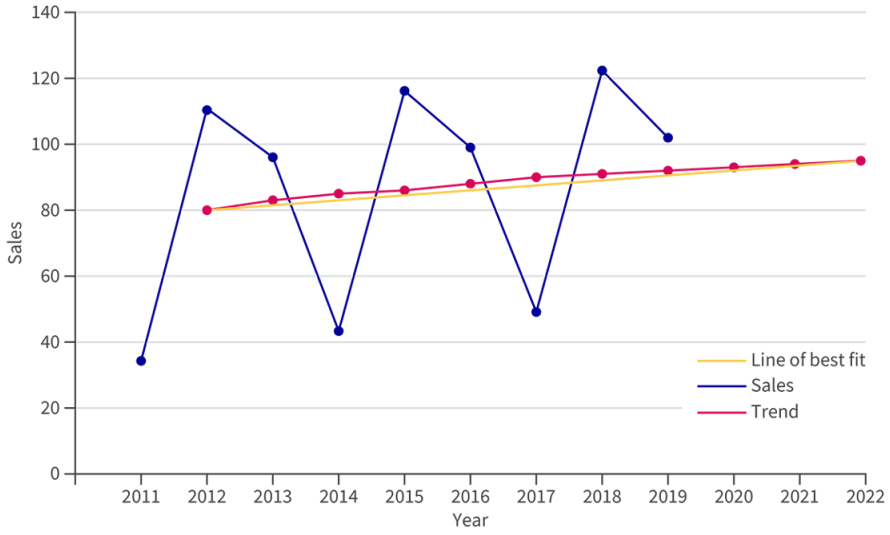


Figure 5. The moving average or trend line extrapolated (extended) out as far as 2022.

More information for figure 5

The image is a line graph illustrating a trend over time. The X-axis represents the years, extending to 2022, while the Y-axis denotes an unspecified metric with numerical values. The graph features a fluctuating pattern, marked by large blue diamond-shaped datapoints connected by a blue line that oscillates with peaks and valleys. A yellow and red trend line runs steadily across the graph, indicating a moving average, which smooths out the fluctuations. This trend line is extrapolated, extending into the future, suggesting a projection based on past data. The graph also includes a legend on the bottom right corner differentiating between the elements of the graph, presumably the data points and the extrapolated trend line, using colors matching those in the graph. The overall trend shows stabilization towards the endpoint of the extrapolated line.

[Generated by AI]

Student view

Overview (/study/app/business-hl/sid-351-cid-762729/o

You can now clearly see the difference between the blue sales line, and the red line that have been plotted with the three-period moving average data. The blue line is very jagged and moves up and down frequently. Every third year, sales drop quite dramatically. However the general trend for the business is still upwards over the period of time. Using the extrapolated line of best fit, the forecast sales figure for 2011 to 2022 have now been added to the graph above.

You are now in a position to answer the original question: should the business expand? Based on the analysis, the business can predict that it will have sales of just 98 cars in 2022. This is less than the desired figure of 100. Therefore, based on the analysis, expansion would not be recommended at this time.

The same calculations can be made to work out the four-part moving average, where a mean of four years is taken into account, and a line of best fit is plotted and extrapolated.

Exam tip

In the exam, you will not be expected to calculate moving averages. The information above has been outlined so that you understand moving average data if it is given to you in a table in the exam.

However, you are expected to be able to:

- graph sales data
- graph given trend data, which may include moving averages
- sketch a line of best fit that goes through mean values for the independent and dependent variables
- extrapolate the line of best fit to make a sales forecast

Activity

Learner profile: Knowledgeable
Approaches to learning: Thinking skills (critical thinking); Communication skills

Marix produces a variety of sports shoes, such as running and walking shoes. Marix is a market leader that has dominated the sports shoe industry for a long time. Marix manufactures shoes in batches of different ranges.

As the sports shoe market is growing, so is the demand for Marix's sports shoes. Celebrity endorsements have helped increase sales. Recently, however, costs of production are increasing as resources are becoming more expensive. The business is experiencing diseconomies of scale.

Student view

The mean sales per month for Marix for the years 2015 to 2021 are given in **Table 6**.

Overview (/study/app/hl/sid-351-cid-762729/o

Table 6. Marix's mean sales of shoes per month from 2015 to 2021.

Year	Mean sales of shoes per month
2015	185
2016	250
2017	400
2018	510
2019	700
2020	925
2021	950

Questions

1. Calculate the mean of the mean sales per month for Marix. (You have studied mean in Section 4.4.6 (/study/app/business-hl/sid-351-cid-762729/book/tool-descriptive-statistics-id-39001/).)
2. Calculate the mean year (Section 4.4.6 (/study/app/business-hl/sid-351-cid-762729/book/tool-descriptive-statistics-id-39001/)).
3. Using graph paper, plot the mean sales of Marix per year from 2015 to 2021. Label your graph clearly.
4. On the graph, construct a line of best fit through the mean sales data obtained from question 2.
5. On the graph, extrapolate a value for mean sales in 2022 and 2023 from the line of best fit.

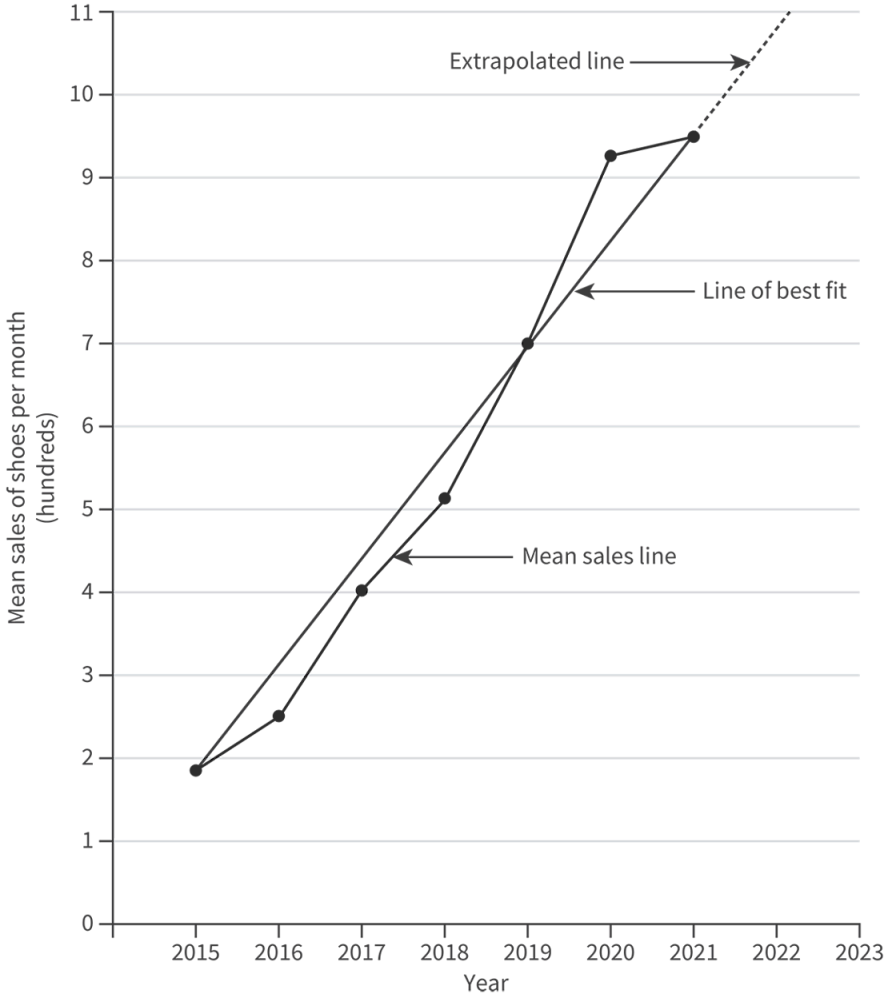
1. An average of 560 shoes are sold per month in each year over the time period. Total sales should be divided by the seven years of mean monthly data to get the mean monthly shoe sales per year.
2. The mean year is 2018. Add the years and divide by the number of years to get the mean year.

   Note: the mean sales and the mean year are needed so that the line of best fit goes through this point. This is necessary to score full marks for a question in the exam that asks for a line of best fit.

3. The following graph should be drawn.

Student view

Overview (/study/app/hl/sid-351-cid-762729/o



4. The line of best fit should go through the mean value of 560 shoes and the year 2018.
5. The extrapolated value of mean sales in 2022 is 1070 shoes (10.7) and for 2023 is 1200 shoes (12).

7. The business management toolkit / 7.1 The business management toolkit

Tool: Descriptive statistics

Tool: Descriptive statistics Tool: Descriptive statistics Tool: Descriptive statistics Tool: Descriptive statistics

Section Student... (0/0) Feedback Print (/study/app/business-hl/sid-351-cid-762729/book/tool-descriptive-statistics-id-39212/print/) Assign

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

As part of the Business Management course, you will need to collect and analyse data. Descriptive statistics are tools that may help you present and interpret the data that you have collected. You should be familiar with most from your Mathematics course. Descriptive statistics studied in this course include:

- mean
- mode
- median
- standard deviation
- pie charts
- bar charts
- infographics
- quartiles

Mean, mode and median

Mean is another word for average. The mean is found by adding together two or more numbers and dividing the total by the number of items. Mode refers to the most frequently occurring value from a set of values. Median is the middle value in a list of ordered numbers.

A mean or average is often used in reporting prices, such as the price of either a litre or a gallon of gas. Very high or very low numbers can skew the mean. Very often the median is then used to see the full picture. When talking about housing prices in an area, for example, it is more helpful to look at the median rather than the mean, as this ensures that one very expensive property does not increase the average.

Look at the distribution of IB diploma scores in **Figure 1**. Remember that the mode is always at the peak of a distribution of a given set of numbers, but this is not always true for the mean and median. For example, the mode of May 2021 IB diploma scores is 34 points, but the mean is 33.02 points.

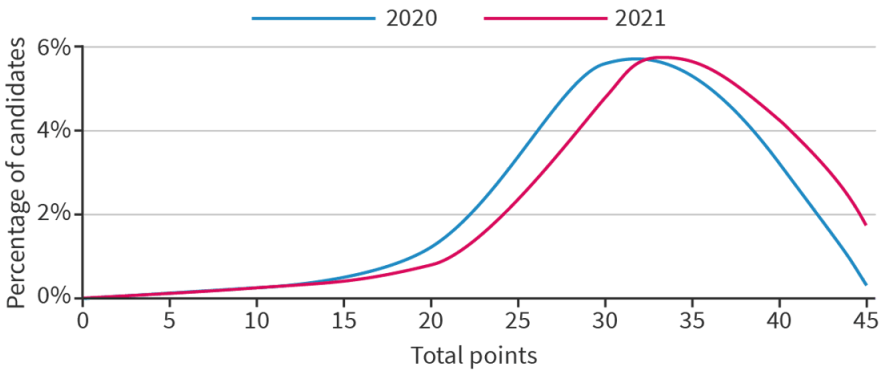


Figure 1. Distribution of IB diploma scores.

More information for figure 1

Student view

Overview (/study/app/hl/sid-351-cid-762729/o

The image is a line graph depicting the distribution of International Baccalaureate (IB) diploma scores for the years 2020 and 2021. The X-axis represents the total points ranging from 0 to 45, while the Y-axis shows the percentage of candidates, marked in intervals up to 6%. There are two lines on the graph: a blue line for the year 2020 and a pink line for 2021.

Both lines begin at the lower left, rise to a peak, and then decline. The peak for 2021 is slightly higher and shifts a bit to the right compared to 2020, indicating a higher mode for 2021. The graph demonstrates that the mode for 2021 is around the 34-point mark, consistent with the provided data, while the 2020 mode is slightly lower. Overall, the distribution curves illustrate the differences between the two years in terms of candidate percentages for each score range.

[Generated by AI]

Making connections

You should be familiar with mean, median, mode and distribution from your Mathematics course.

Standard deviation

Standard deviation – sometimes written using the Greek letter sigma (σ) – looks at the dispersion of data around its mean. A high standard deviation indicates that the data is spread out. A low standard deviation indicates that the data is clustered around the mean (see **Figure 2**).

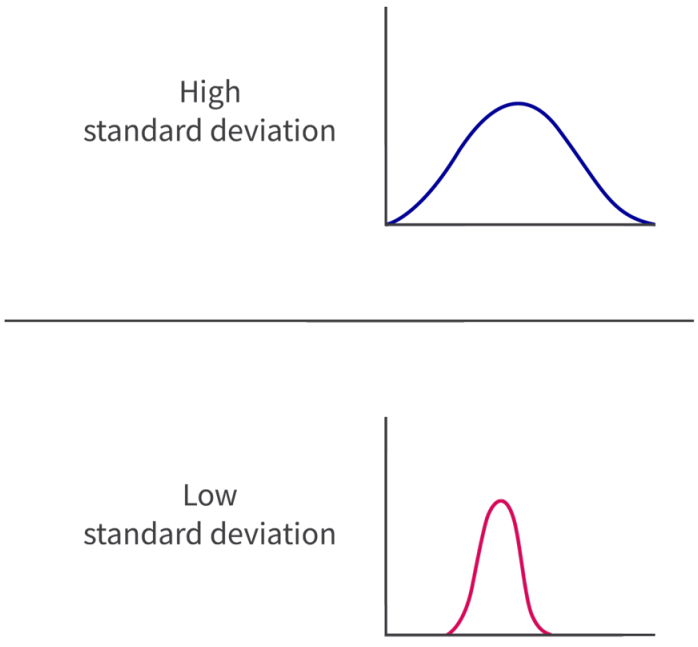


Figure 2. High and low standard deviation.

Student view

Overview (/study/app/hl/sid-351-cid-762729/o

More information for figure 2

The image consists of two separate graphs that illustrate the concept of high and low standard deviation.

The top part of the image shows a graph with a curve representing a high standard deviation. The data is spread out, creating a wider curve, indicating a greater dispersion around the mean.

The bottom part of the image displays a graph with a curve that is narrower, representing a low standard deviation. Here, the data points are clustered closely around the mean, resulting in a more peaked curve.

Each graph includes text that labels the curves as "High standard deviation" and "Low standard deviation", respectively. The curves visually demonstrate the difference in data dispersion between high and low standard deviations.

[Generated by AI]

As shown in **Figure 3**, in a normally distributed set of data (a bell-shaped curve set):

- about 68% of data falls within one standard deviation of the mean
- about 95% of data falls within two standard deviations of the mean
- about 99.7% of data falls within three standard deviations of the mean

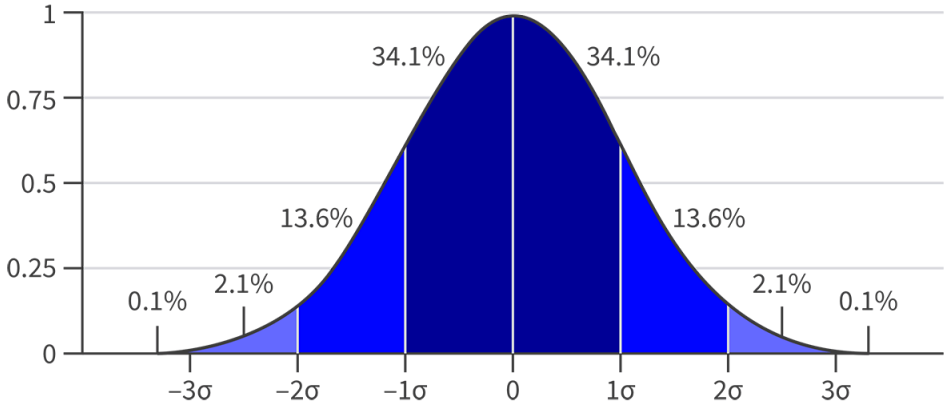


Figure 3. In a normally distributed set of data, 68.2% of data falls within one standard deviation of the mean.

More information for figure 3

The image is a bell curve illustrating a normal distribution. In the center of the curve, representing the mean, 68.2% of the data falls within one standard deviation. The curve is symmetrically divided into two halves. Each half contains segments indicating one, two, and three standard deviations from the mean. The widths of each segment decrease as they move away

Student view

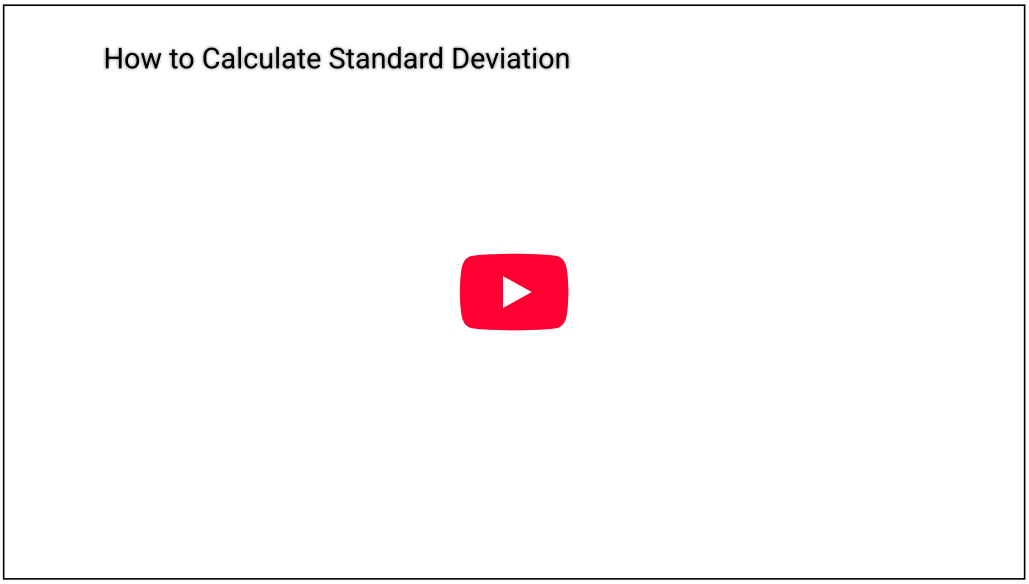
Overview (/study/ap hl/sid-351-cid-762729/o

from the center. Each segment is labeled with the percentage of data it represents. This visualization helps illustrate how standard deviation describes the spread of data in a normal distribution, where most data points are close to the mean and fewer data points exist at the extremes.

[Generated by AI]

One of the key standard deviation applications in business is to analyse the price changes of a share of a publicly held company and to understand the statistical likelihood of an event taking place.

You will not need to calculate the standard deviation in your Business Management exam, but if you are interested in how it is calculated, the following video will take you through it.



Video 1. A step-by-step explanation of how standard deviation is calculated.

Activity

Learner profile: Inquirer
Approaches to learning: Thinking skills (transfer)

Company XYZ's annual revenue data is shown in **Table 1.**

Table 1. Company XYZ's annual revenue.

Student view

Year	Revenue
2020	$181 billion
2019	$160 billion
2018	$136 billion
2017	$110 billion
2016	$89 billion
2015	$74 billion
2014	$65 billion

1. What would the mean revenue for the years 2014 to 2020 be?
2. What would the median revenue for the years 2014 to 2020 be?
3. The standard deviation for the set of data above is 40.87. Based on this standard deviation, if the 2021 revenue were to be $450 billion, would this be characterised as an outlier?

1. (181 + 160 + 136 + 110 + 89 + 74 + 65) ÷ 7 = $116.43 billion
   This is the sum of the revenues divided by 7.
2. The numbers are already listed in ascending order. The middle of the 7 numbers is $110 billion.
3. $450 billion is more than three standard deviations away from the mean (which is 116.43). It is therefore improbable, or an outlier.

International Mindedness

Be mindful of regional differences when presenting and interpreting data. For example:

- In some countries, a comma is used to separate thousands; in other countries a full stop or a space is used. In the USA, for example, the number ten thousand would be written as 10,000, while in Germany it would be written as 10.000. In Russia the correct way of writing the number would be 10 000. This Kognity book uses a space to separate thousands.

Overview (/study/ap hl/sid-351-cid-762729/o

- European countries mostly use the metric system (metres, kilometres, kilograms, etc.), while the USA uses the imperial system (feet, miles, pounds, etc.).

Bar Charts and pie charts

A bar chart is a chart with rectangular bars showing the values represented (see **Figure 4**). Bar charts are generally used to compare different occurrences of the same event or item. For example, you can use a bar chart to compare price changes of one product over time as well as to compare prices of similar products.

A pie chart is a circular graph in which segments of the circle represent percentages of the total (see **Figure 4**). Pie charts are generally used to represent percentages of a whole, such as the breakdown of sales by product.

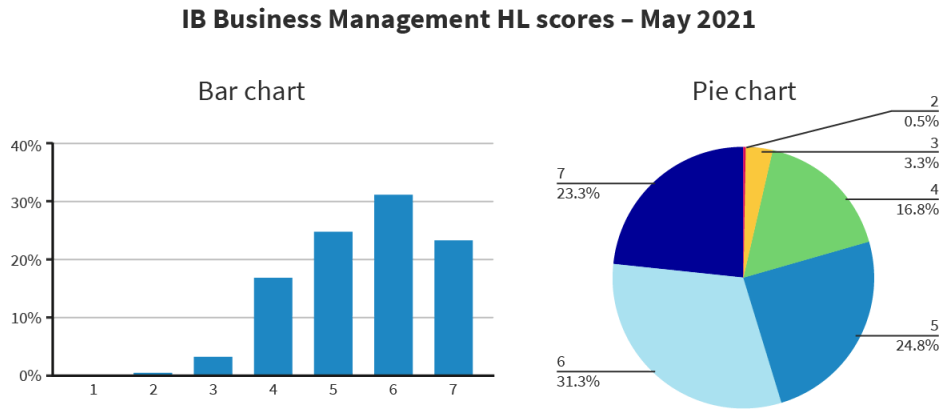


Figure 4. A bar chart is often used to compare, while a pie chart is used to show parts of a whole.

More information for figure 4

The image shows two charts comparing IB Business Management HL scores from May 2021. On the left, a bar chart displays scores from 1 to 7 on the horizontal axis, with percentages from 0% to 40% on the vertical axis. The bars show that scores are clustered mostly between 4 and 6, with Score 4 at 20%, Score 5 at around 28%, and Score 6 at 35%. On the right, a pie chart visualizes the same data, indicating the percentage contribution of each score value to the total. Score 6 has the largest segment at 31.3%, followed by Score 5 at 24.8% and Score 7 at 23.3%. The least percentage was Score 2 at 0.5%.

[Generated by AI]

Activity

Learner profile: Inquirer
Approaches to learning: Research skills (information literacy)

Student view

You may or may not have used Microsoft Excel or Google Sheets (or a different spreadsheet program) in your studies to create bar charts and pie charts. The skill of creating your own graphs using technology will be of great use for presenting data in your internal assessment.

1. Company XYZ's annual revenue data is shown again in **Table 2**.

Table 2. Company XYZ's annual revenue.

Year	Revenue
2020	$181 billion
2019	$160 billion
2018	$136 billion
2017	$110 billion
2016	$89 billion
2015	$74 billion
2014	$65 billion

Use the data in **Table 2** to create a bar chart. Remember to label the axes correctly and fully (for example with the units and the currency), to use the appropriate units and to give the bar chart a title. Ensure that the title is specific (for example, include the name of the company, the year range and the units).

2. Company XYZ's revenue composition in 2020 is as follows:

Advertising revenue: 80%
Cloud revenue: 8%
Other revenue: 12%

Use the data above to create a pie chart. Remember to give the pie chart a title and to label each segment.

Infographics

An infographic is a graphic representation of information (see **Figure 5**). It is used to show research findings or to break down data in a visual way. You should be very careful when relying on infographics to convey information. Infographics may be artistically represented but may often not be drawn to scale.

Overview (/study/ap hl/sid-351-cid-762729/o

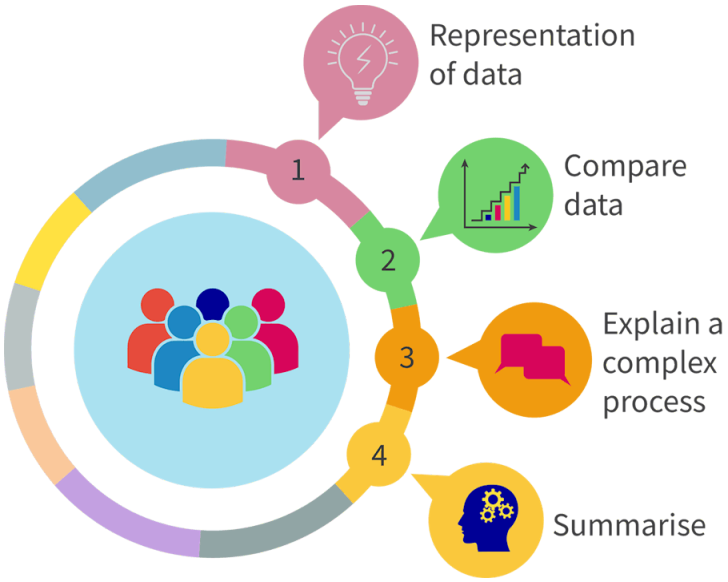


Figure 5. Infographics can be a useful way to visualise data, but the data may not necessarily be drawn to scale.

More information for figure 5

The infographic consists of four numbered segments, each representing a concept with a unique icon. In the center, there are icons of multicolored human figures grouped together. On the top right, segment 1 shows a lightbulb icon indicating ideas or innovation. Segment 2 features a bar graph icon, suggesting data or statistics. Segment 3 contains speech bubbles, denoting communication or dialogue. Segment 4 includes a head with gears, reflecting thinking or processing. Each segment is visually distinct with different colors and illustrations.

[Generated by AI]

Quartiles

Quartiles result from dividing a set of numbers into quarters (see **Figure 6**). For example, a country's income data might be represented by looking at:

- the lowest 25% of income earners
- the second lowest 25% of income earners
- the second highest 25% of income earners
- the highest 25% of income earners

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

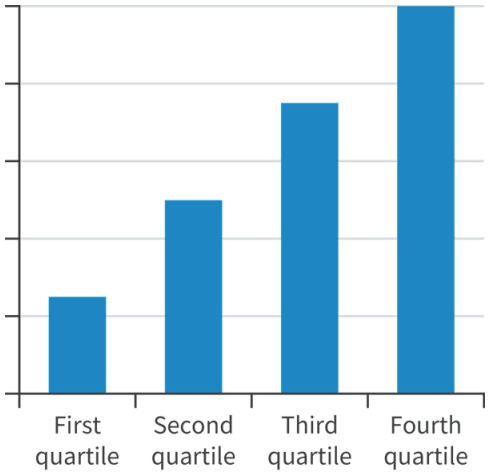


Figure 6. Quartiles result from dividing a set of numbers into quarters.

More information for figure 6

The image is a geometric diagram featuring a series of interlocking shapes. The diagram is composed of blue and gray polygons forming a pattern that resembles a zigzag or staircase design. The blue shapes are diamond-like and stacked in a way to create a continuous pattern with the gray background. The diagram does not contain any text and appears abstract, focusing on the arrangement and repetition of shapes to form a cohesive structure.

[Generated by AI]

Problems with data presentation and interpretation

'*There are three kinds of lies: lies, damned lies, and statistics.*'
(Attributed to former UK Prime Minister, Benjamin Disraeli.)

Descriptive statistics are an excellent way to understand the meaning of data. However, interpreting graphic representations of data takes some skill. When looking at data, you need to pay close attention to the following:

- **The title of the diagram.** Take the time to read and understand the title of the diagram. Titles may be misleading, sometimes intentionally.
- **Axes and scale.** The two diagrams in **Figure 7** look very different. At first glance the first graphic appears to show significant growth and the second graphic appears to show no growth. In fact, the two diagrams show the same data but with different scales chosen for the *y*-axis.

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

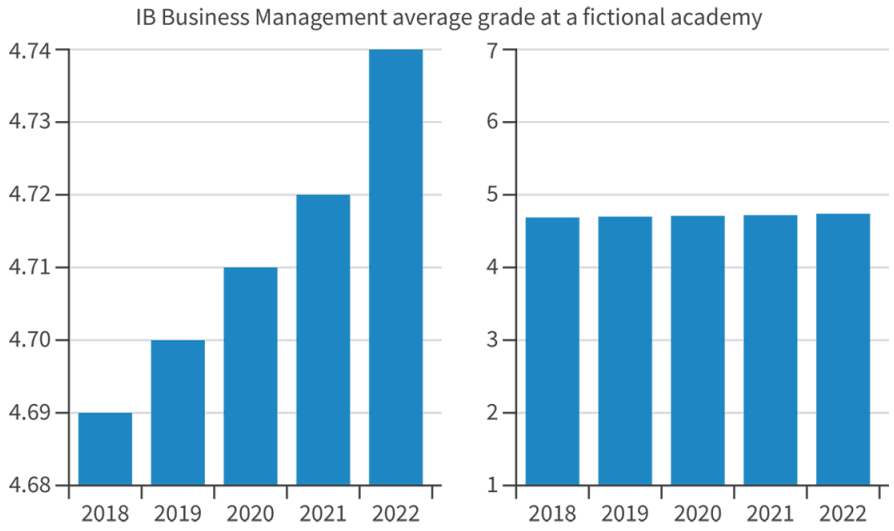


Figure 7. Using the same data but changing the scale of the vertical axis.

More information for figure 7

The image presents two bar charts side by side, illustrating how changing the scale of the vertical axis affects the visual representation of data. Both charts have a horizontal axis representing categories or data points and a vertical axis displaying quantity. The chart on the left features a more extended range on its vertical axis with denser gridlines, giving the appearance of more minor variances between the bars. The right chart's vertical axis scale is compressed or shorter, causing greater visual differences in the height of the bars, even if the values are the same. This visualization emphasizes the importance of understanding axis scaling when interpreting data from bar charts.

[Generated by AI]

- Year range of data. Sometimes data is 'cherry picked' by year. This means that only the data that is convenient to the writer is presented. You should always pay close attention to the *x*-axis chosen for data over time (see **Figure 8**).

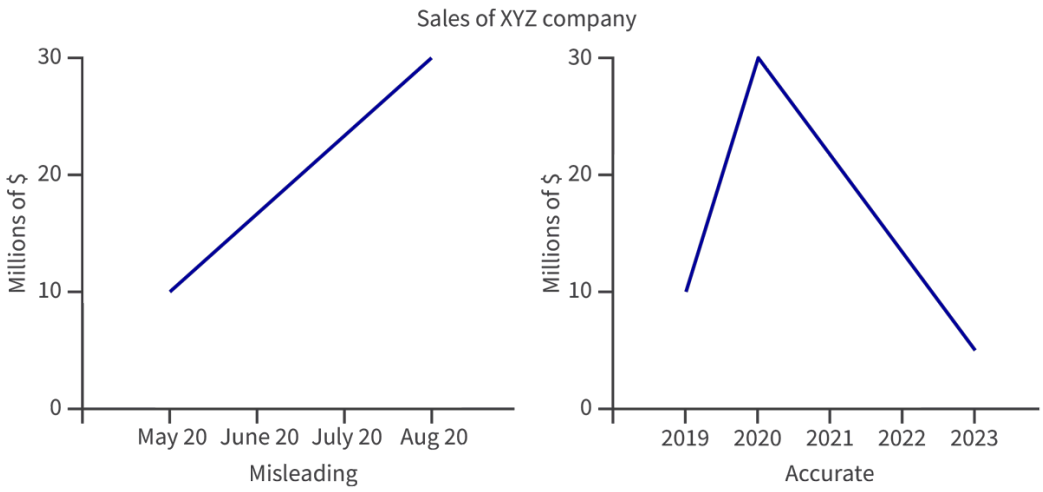


Figure 8. Using the same data but changing the scale of the horizontal axis.

Student view

Overview (/study/app/hl/sid-351-cid-762729/o

More information for figure 8

The image displays two line graphs comparing sales data for XYZ company with different horizontal scales. The first graph (left) labeled 'Misleading' shows data points from May 2020 to August 2020, with a steep incline from 10 to 30 million dollars. The X-axis is labeled with months (May, June, July, August) in 2020 and the Y-axis is labeled in 'Millions of $' ranging from 0 to 30. The second graph (right) labeled 'Accurate' shows data from 2019 to 2023, capturing a more comprehensive trend: sales rise sharply to a peak in 2020, followed by a decline. The X-axis is labeled with years (2019, 2020, 2021, 2022, 2023) and the Y-axis has the same range as the first graph. This comparison illustrates how changing the scale of the horizontal axis can affect the perceived representation of sales trends.

[Generated by AI]

- **Correlation versus causation.** Correlation is a statistical term outlining a relationship between two variables, which may or may not be a causal one. Remember that just because events are correlated, it does not mean that one is caused by the other (see **Figure 9**).

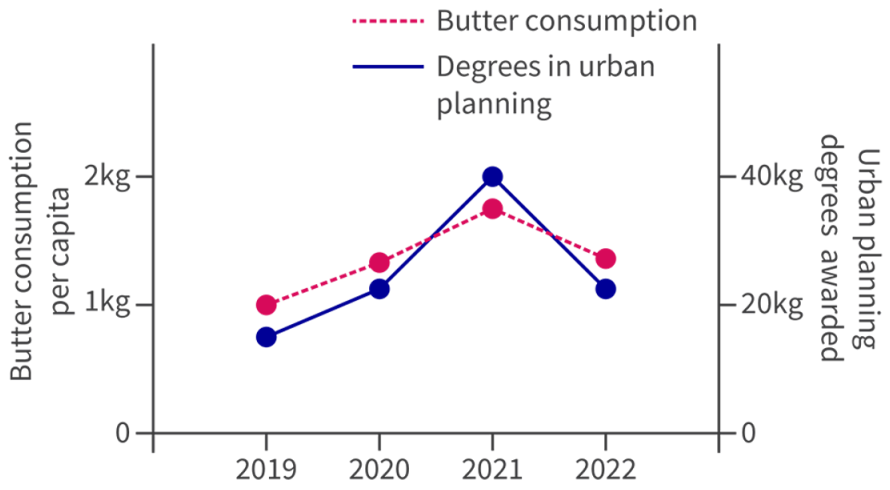


Figure 9. Correlation, not causation.

More information for figure 9

The image is a diagram illustrating a collection of data flows with pink and blue directional arrows. These arrows point towards various nodes, signifying different data points or categories. The overall layout appears to create a network, showing how each element is interconnected. The arrows might indicate processes or dependencies between different parts of the diagram. This could represent abstract flow of activities or processes used for depicting correlation versus causation, considering the context provided.

[Generated by AI]

Student view

Overview (/study/ap hl/sid-351-cid-762729/o

Watch the following video to understand how statistics may be used in a misleading way.

Video 2. Examples of how statistics can be misleading.

Concept

Ethics

As seen in the examples above, it is quite simple to present data in misleading ways, and you will need to be careful when relying on data to make conclusions. For this reason, presentation of data carries with it ethical considerations.

Exam tip

As part of this course, you will need to write an internal assessment, which is a research project about a real business issue or problem facing an organisation.

You will need to select your own primary and/or secondary sources. If primary research is conducted, you will also need to present data in a way that allows you to analyse the business and answer the research question.

3 section questions

Student view

Question 1

Overview (/study/ap hl/sid-351-cid-762729/o

Which method of data presentation is recommended if you want to show percentages of a whole?

1 A pie chart ✓

2 A bar graph

3 A normal distribution

4 An infographic

Explanation

If you want to display percentage data, such as market shares or people's preferences, then a pie chart can do this quickly and clearly.

The other methods do not show percent shares of a whole.

Question 2

In a normal distribution, how much of the data falls within one standard deviation?

1 68% ✓

2 95%

3 99.7%

4 100%

Explanation

In a normal distribution, 68% of data falls within one standard deviation. The other answers are incorrect.

Question 3

Which method of data presentation would you recommend to a fellow student who wants to show data divided into quarters?

1 Quartiles ✓

2 Quantiles

3 Quintiles

Student view

Overview (/study/app/hl/sid-351-cid-762729/o

4 A line graph

Explanation

Quartiles provide a method of dividing the data in a way that shows quarters. A quantile does not specify a number of divisions. A quintile refers to dividing data into five parts. A line graph does not show quarters.

Rate subtopic 7.1 The business management toolkit

Help us improve the content and user experience.

Student view