

## 5.8 Research and development (HL)

# The importance of research and development

Research and development (R&D) is a crucial part of many industries. Research and development is necessary to provide knowledge and understanding of consumer needs and to improve products, processes and efficiency. It helps businesses to develop new products or improve processes to gain a competitive advantage.

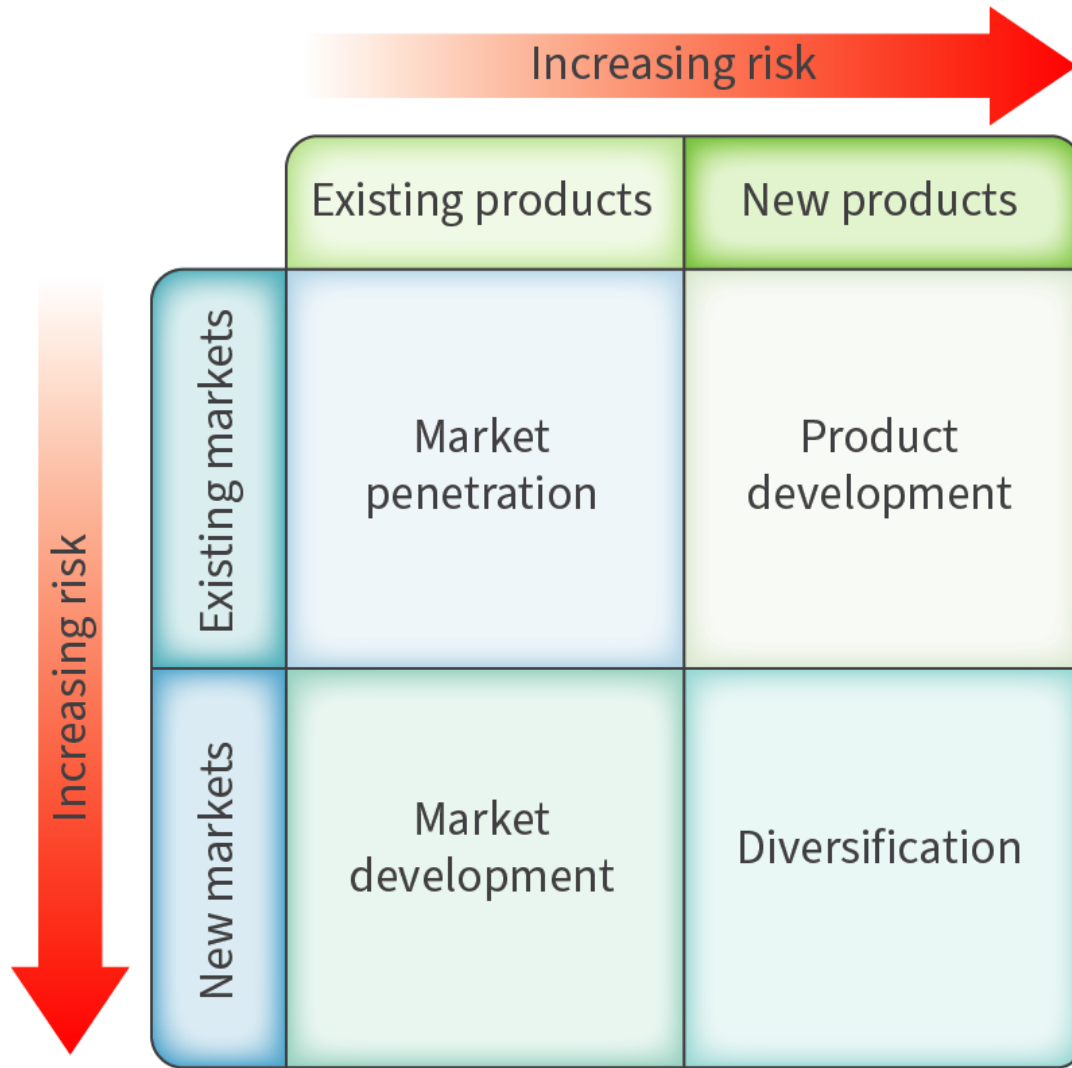
## Theory of Knowledge

Beauty companies, pharmaceutical companies and biomedical science companies need to carry out extensive testing before products can reach human trials. Whilst part of that testing can be completed using computerised models, some of these companies still rely on animal testing. Companies may also wish to alter genes or manipulate DNA in order to find solutions.

- How might the methods used in R&D be limited by ethical considerations?

## Benefits of research and development for business

Companies spend on R&D for a number of reasons, some of which can be linked to the product life cycle, as mentioned in [Section 5.8.0 \(/study/app/y12-business-management-a-hl-may-2024/sid-351-cid-174702/book/the-big-picture-id-39044\)](#). They can also be linked to the Ansoff matrix, which you learned about in [Section 1.5.7 \(/study/app/y12-business-management-a-hl-may-2024/sid-351-cid-174702/book/tool-ansoff-matrix-id-36539\)](#) and is shown again here in **Figure 1**. Of particular importance in relation to the Ansoff matrix is product development and diversification.



**Figure 1.** R&D can be linked to the Ansoff matrix through product development and diversification.

## Product development and diversification

Research and development allows businesses to develop new products for their existing markets (product development) or for new markets (diversification). With a new product, businesses can cultivate a unique selling point (USP) that helps to increase sales revenues. Businesses can also improve their brand image by being at the forefront of new product development. For new products, a business may be able to secure a patent and monopoly production rights, resulting in large profits over a period of time. Product development and diversification require that the business carry out extensive research and development on their product, and market research on their existing or new markets.

Basilisk (<https://basiliskconcrete.com/en/how-does-it-work/>), for example, is a company that has used new technology to create concrete with ‘self-healing’ properties. Over time, concrete can crack and become weaker. Replacing concrete structures that have

cracked uses valuable resources and emits large amounts of CO<sub>2</sub>. The new technology now enables concrete to repair itself, extending the life of concrete structures over time and improving sustainability. This is a new product that may be sold in existing or new markets for the business.

Exam tip

When considering the concept of research and development you should never assume that research and development spending is a guaranteed way to innovate and be successful. ‘Might’, ‘may’ and ‘could’ are all important words you should use when writing about research and development. You should think about the short-term and long-term implications of large R&D spending and question the impact it ‘might’ have on profitability.

Lower production costs

Process innovation leads to improvements in the manufacturing process. Combining the ideas of lean production ([Subtopic 5.3 \(/study/app/y12-business-management-a-hl-may-2024/sid-351-cid-174702/book/the-big-picture-id-39339\)\)](#) and research and development, businesses can gain important cost leadership over competitors. For example, R&D in wind turbine technologies has led to increases in power output at lower costs, which has increased the profits for businesses providing wind energy. **Table 1** outlines some benefits and limitations of research and development for businesses.

**Table 1.** Benefits and limitations of research and development for businesses.

Benefits of R&D	Limitations of R&D
<b>Lower costs.</b> Research and development in relation to manufacturing processes and materials can lower costs of production for businesses, increasing profits.	<b>Risk.</b> Businesses can spend large sums of money on salaries and capital costs related to research and development that does not always result in products or services that consumers want. As a result, the money may be wasted.

<p><b>Product development and patents.</b> New products can result in increased sales revenues through unique selling points (USPs); patents can secure monopoly production and large revenues for a period of time.</p>	<p><b>Lower short-term profits.</b> Research and development is costly so, in the short term until a product is on the market, profits may be reduced.</p>
<p><b>Diversification.</b> New products in new markets can help diversify revenue streams, making the business more resilient over time.</p>	<p><b>Corporate espionage.</b> Competitors may steal another business's innovations, unless they are protected by cyber security (<a href="https://study/app/y12-business-management-a-hl-may-2024/sid-351-cid-174702/book/the-big-picture-id-39043">Subtopic 5.9 (/study/app/y12-business-management-a-hl-may-2024/sid-351-cid-174702/book/the-big-picture-id-39043))</a> and patents.</p>
<p><b>Brand image.</b> Businesses that innovate well develop a strong reputation in the market that can increase sales and profits through customer loyalty and price leadership.</p>	<p><b>Retaining talent.</b> Businesses that innovate well develop a strong reputation in the market that can increase sales and profits through customer loyalty and price leadership.</p>

## An evaluation

After reading this section, you may be convinced that every company should invest heavily in R&D. However, you must always consider both sides of an argument. R&D has high failure rates. For every idea that makes it to market, 20 previous ideas may not have been successful. Even products that are launched may not be successful and may need to be supported with costly marketing campaigns. In short, R&D is expensive and it is unwise to recommend it to businesses facing immediate short-term cash flow problems.