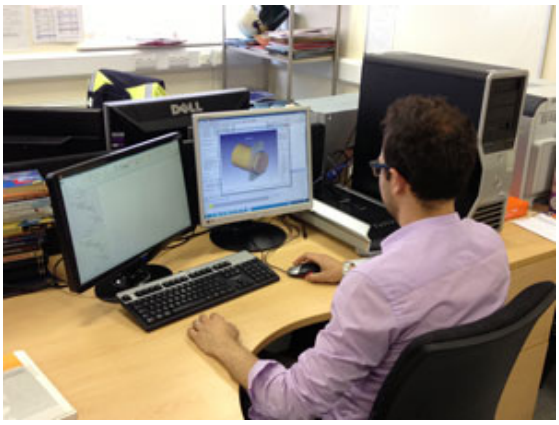
THE TIMES 100
BUSINESS CASE STUDIES

Research and development – Sheffield Forgemasters International (SFIL)



R&D is the function within an organisation that carries out technical and/or scientific research in the development of new or existing products, processes or services. Research is a detailed study of a subject. It can lead to new ideas, new information and new understanding that can be used to solve a problem. In an engineering business, like SFIL, innovation is a core activity. It is important for its survival and can help the business remain competitive in changing markets. Innovation can be applied to product renewal or the design of new processing technologies.

SFIL has to meet the challenges of competition from low-cost manufacturers and suppliers. It does this by continually developing new ideas – ideas that can be developed into new products, materials and process improvements. R&D is very costly. However, it is an important investment. Money spent on R&D can secure the future of an organisation. The majority of its R&D activity involves the optimisation of its manufacturing processes, material developments and the implementation of new manufacturing processes. For SFIL, one focus is on raising quality and reducing costs through improved methods of working. Another is on researching new materials and techniques in forging and heat treatment practices.

Development involves turning ideas generated from research into a commercial product or process. The research stage might generate numerous ideas and a business then needs to select the appropriate ones to develop commercially. These ideas will be assessed based on the client brief. The next stage involves testing the ideas, testing is an important part of the R&D process. SFIL has a commercial facility that provides mechanical and metallographic testing and analysis services - specialising in the testing and analysis of steels. Its research activities cover all aspects of the manufacturing process. For example, the research team monitor the expansions and contractions of steel, through cooling after casting and through heat treatment, to test for strength and fatigue resistance. The team also use computer simulations to help achieve the extremely high quality standards required. Researchers can also build models (prototypes) to replicate a system. These can be physical models or computer-based representations. SFIL uses 3D solid modelling to design parts, assemblies, tooling and processes for casting and forging activities. Researchers also use a scanning electron microscope to investigate microstructure property relationships. These trials are expensive. However, the size of the components being created by SFIL means that there is no room for error once the process is used in commercial production. Engineers need to get the product ‘right first time’.

R&D is not without its challenges. These include the risks associated with the costs, the timescales and technical issues in each project. For example, casting of extreme size and shape as well as heat treatment also presented challenges. SFIL must deliver all products on time so time constraints can be a challenge. Other challenges include maintaining health and safety, looking after the wellbeing of employees and sustaining the environment. However, expenditure on R&D can bring significant benefits. It has created a distinct competitive advantage for SFIL. Being the first in the world to produce large-scale cast and forged nuclear components helps to distinguish SFIL from its competitors. The investment in R&D also enables SFIL to focus on major projects across the business and to form partnerships with high-profile companies in the delivery of its solutions and products.

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Questions

1. What is research and development?

2. Describe the stages within the development process.

3. Explain the challenges of R&D.

4. Analyse the reasons for carrying out new product development.

Task

Working in a small team, go through the R&D stages for the creation of a new soft drink:

- Generate ideas – carry out small scale research with other groups
- Write a product brief
- Determine the product specification
- If possible, make a prototype of the packaging
- Explain how you would test the product
- Consider the promotion that could be carried out to support the launch of the new product

What have you learned?

Mind the gap - write a paragraph about research and development with some key terms missing. Swap with a partner and fill the gaps.