

expensive skilled and educated labour with faster turnaround times for work. There is a large pool of talented and motivated young workers, many who are graduates from India's 380 universities. There is a risk, however, that when offshoring, a business can lose its knowledge and capabilities. In essence, the business may be hollowed out as internal departments are closed and moved to an outside supplier.

Technology

Businesses operate in a dynamic environment. One of the major external influences on business is technological change. **Technology** is the equipment and knowledge that are available to help businesses perform certain functions or make products. Technology can result in the development of new methods of production or new equipment that helps businesses perform functions more quickly and often at a lower cost. There is a heavy reliance on the operations manager to be aware of this technology and assess its application to the business. The manager weighs the costs of the upgrade in technology against the long-term expected benefits, such as increased sales or higher profits.

When making a decision about technology use, a business must take into account various factors, including:

- the speed of change taking place in that area of technology
- the technology that competitors are using
- the finances available for a change in technology
- how long it will take to introduce the

technology (especially if all work needs to be at a standstill)

- whether staff will need to be retrained or possibly made redundant.

Some technological changes cannot be ignored. The evolution of computer technology has resulted in major changes for most businesses. The use of computers as word processors, storage systems and communication systems has changed the way businesses record and process information about transactions, employees and general data. It has even enabled people to work from home.

Leading edge

In a highly competitive market many businesses seek a competitive advantage by being the first to develop and implement new technology. Leading-edge technology may be referred to as being at the cutting edge. One step further is bleeding-edge technology – this is technology so new that there is a high level of risk and uncertainty in using it. A business that can incorporate leading-edge technology will force its competitors to follow it if they also wish to remain competitive. Unfortunately, once leading edge is discussed in the everyday media and school textbooks it may no longer be leading edge.

The goal of the federal government's Department of Innovation, Industry, Science and Research is to encourage the sustainable growth of Australian industries by encouraging innovation, knowledge creation, cutting-edge science and research, international competitiveness and greater productivity. Australia will benefit from long-term economic growth and international competitiveness of exports.

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Table 4.5 Examples of leading-edge technology

Industry	Example of leading-edge technology
Agriculture	Using Global Positioning System (GPS) units to precision map areas for planting and ploughing, direct equipment and fertilise with little human intervention.
Education	Delivery of all course materials online, tutorials using blogs, forum posts and video conferencing, submission of assignments using email.
Medicine	A tissue regenerating powder made from pig bladders called extracellular matrix. It is a mix of protein and connective tissue that can be used to repair tendons and other human tissue. It may be used to regrow lost limbs and damaged organs.
Transport	The new Airbus A380 contains approximately 25% carbon fiber-reinforced plastic (CFRP), a lightweight, but expensive material.

Established

This type of technology has been tried and proven and is therefore very reliable and dependable. In operations the implementation of technology has three broad aims:

- to remove geographic barriers
- to find cost savings and time savings
- to give a business better control over operations.

Types of established manufacturing technology include CAD, CAM and robotics described in Chapter 2. The internet has been a business tool since the mid-1990s. Computer modelling software is used to integrate all parts of operations management to find costs savings and time savings. Office technology, such as business intranet, smart phones and EFTPOS, have been used to offer better services and faster service delivery to anywhere in the world.

Two more examples of established technology are electronic data interchange and project management software. EDI involves the use of computers, barcodes and scanner systems to monitor individual

stock items and keep accurate records of inventory levels. Today, with the use of computers, EDI, inventory methods and rationalisation of suppliers, many businesses maintain relatively low inventory levels. In order for this system to operate efficiently there must be close communication between the functional departments and the business's major suppliers.

Computer modelling or project management software for operations can be used to create Gantt charts and perform critical path analysis. Software such as Microsoft Project allows an operations manager to precisely plan and schedule operations because lead times, delivery times, inventory requirements task analysis, labour needs, equipment and even breaks for maintenance can be entered into the model so that the most efficient sequence and schedule can be calculated. Regular reports can be produced so that operations managers can monitor the progress of operations and take any corrective action if needed.