



CHAPTER

1

Introduction

- **Introduction**
- **What is operations management?**
- **The history of operations management**
- **The role of operations management**
- **Operations within the organization**
- **The process view of operations**
- **Service operations management**
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LEARNING OBJECTIVES

- Define the term operations management
- Understand the role of operations in transforming the organization's inputs into finished goods and services
- Describe the process view of organizations
- Define the main types of service operations
- Understand the distinction between front-office and back-office tasks
- Understand the strategic role of operations
- Explain the relationship between technology and operations

INTRODUCTION

This chapter introduces the concept of operations management and describes some of the decision areas it covers. The operations activity is examined in terms of its components and its role in the organization. It is defined as a transformation process and as such occurs throughout the organization. The operations function itself is defined as being concerned with transformation processes that provide goods and services for customers. Some key themes of operations management are also explored, namely service operations management, the strategic role of operations and the use of technology in operations management.

WHAT IS OPERATIONS MANAGEMENT?



Operations management is about the management of the processes that produce or deliver goods and services. Not every organization will have a functional department called ‘operations’ but they will all undertake operations activities because every organization produces goods and/or delivers services.

Operations management

Operations management is about the management of the processes that produce or deliver goods and services.

Operations management has made a significant contribution to society by playing a role in areas such as increasing productivity, providing better quality goods and services and improving working conditions. Productivity has been increased through such measures as the use of technology (Chapter 6) and new production methods (Chapter 13). Increased productivity permits the more efficient production of goods and services and so helps raise living standards. Better quality goods and services are available through the use of quality initiatives such as total quality management (TQM) (Chapter 17). The rate of improvement in

quality levels is reflected in programmes such as Six-Sigma (Chapter 17). Improved working conditions are an outcome of the realization that the contribution of people is vital to an organization’s success. Job design (Chapter 9) is used to help reach the full potential of employees.

The operations manager will have responsibility for managing resources involved in this process. Positions involved in operations have a variety of names, and may differ between the manufacturing and service sectors.



Examples of job titles involved in manufacturing include logistics manager and industrial engineer. Examples in the service industry include operations control manager (scheduling flights for an airline for example), quality manager, hotel manager and retail manager. An example job description for an operations role is shown in the box 'Job Description for Operations Director'.

Job Description for Operations Director (salary circa. £65,000)

Operations Director

This company has established itself as a leading manufacturer within an industry sector where growth is encouraging overseas competitors to venture into the UK market. Profitable, yet aware of the need to change, a plan has been put into place that will allow greater cohesiveness between manufacturing and commercial operations. Increased flexibility in production techniques is also on the corporate agenda with cost out and development of new products associated with initiatives in this area. This is a key position within the executive team carrying responsibility for all aspects of company activity with the exception of finance and commercial functions.

The Role

- Devise and implement a business operations strategy that secures the achievement of p&l objectives that are in line with the overall business plan.
- Management, motivation and development of the workforce (c. 120) through a period of change whilst ensuring continuous improvement in quality and operational efficiency.
- Create a culture of customer awareness that leads to collaborative product development and prompt resolution of issues that might affect perceptions of customer service.
- Influence the future direction of the business by being a fully participative member of the executive board.

The Candidate

- Graduate, operations or general manager of a customer-focused manufacturing business.
- Adept leader of change, able to devise innovative ways of working and ensure employee buy in.
- Has implemented, or at the very least explored the feasibility of, transferring some manufacturing activities to lower cost offshore alternatives.
- Clear communicator, numerate. Committed to achieving objectives and determined in overcoming obstacles.

People involved in operations participate in a wide variety of decision areas in the organization, examples of which are given in Table 1.1. The scale, importance and hopefully the excitement of operations management is indicated by the range of decision areas shown. Like many texts on the subject area of operations management, this book is structured around these decision areas (see chapter references in Table 1.1). The book is divided into sections on introducing operations and strategy (Chapters 1 to 2), design (Chapters 3 to 9) and management (Chapters 10 to 18) to aid clarity.

Chapter	Decision area	Example decision
2	Operations strategy	What strategy should be followed?
3	Process types	How do we configure the process that will deliver our service to customers?
4	Layout design	How do we organize the physical layout of our facilities and people?
5	Facility design and location	What is the location of our operations facilities?
6	Process technology	What role should technology have in the transformation of materials in the operations system?
7	Product and service design	What products and services should the organization provide?
8	Process design	How do we design the service delivery process?
9	Job and work design	How do we motivate our employees?
10	Planning and control	How do we deploy our staff day-to-day?
11	Capacity management	How do we ensure that our service is reliably available to our customers?
12	Inventory management	How can we keep track of our inventory?
13	Lean operations and JIT	How do we implement lean operations?
14	Enterprise resource planning	How do we organize the movement of goods across the supply chain?
15	Supply chain management	What benefits could e-procurement bring to our operations?
16	Project management	How do we ensure our projects finish on time and within budget?
17	Quality	How can we implement a TQM programme?
18	Improvement	What role could continuous improvement have in our operation?

Table 1.1: Decision Areas in Operations Management.

THE HISTORY OF OPERATIONS MANAGEMENT

Operations management did not emerge as a formal field until the 1950s and 1960s when textbooks specifically dealing with operations management were published. Major developments up to this point affecting the field of operations management start with the Industrial Revolution of the eighteenth century. Before this time products were made individually by skilled craftspeople in their homes and so were relatively expensive to produce. The use of inventions such as the steam engine (by

James Watt in England in 1764) and concepts such as the use of interchangeable parts (from Eli Whitney in 1790) and the division of labour (described by Adam Smith, 1776) led to the move to volume production. Here mechanization (provided by steam power) was combined with the use of low-skilled labour (people were given small, simple tasks using the concept of the division of labour) to produce standard parts in high volumes, which could be assembled into products. These ideas were refined and the use of scientific management, developed by Frederick W. Taylor and incorporating such elements as time study (Chapter 9), and the invention of the moving assembly line, first used by the car manufacturer Henry Ford in 1913, led to the era of mass production at the start of the twentieth century. This represented a major breakthrough in the ability of production systems to offer goods to a large amount of customers at a price they could afford.

An additional element in the makeup of operations management occurred during the First World War when the need to solve complex problems of logistics and weapons-system design led to the development of operations research. A number of the techniques developed then are still part of the operations management field today. As stated earlier, operations management as a discipline then began to emerge in the 1960s and has continued to develop since.

The 1970s saw the use of computers in materials requirements planning (MRP) software (Chapter 14) for inventory control and scheduling. The 1980s saw the emergence of the just-in-time (JIT) philosophy (Chapter 13) from Japan, which transformed the way businesses deliver goods and services. In response to the need to improve the quality of goods and service the ideas of total quality management (TQM) (Chapter 17) were widely adopted in the 1980s. The 1990s saw the emergence of such concepts as supply chain management (Chapter 15) and business process re-engineering (BPR) (Chapter 17). Most recently the use of the Internet to conduct transactions or e-Commerce (Chapter 6) has changed the way operations management is performed.

The history of operations shows how the field has adapted and continues to change as it tries to respond to an ever greater range of challenges, from the needs of customers who require high quality, low price goods delivered quickly to managing the impacts of global competition and addressing environmental concerns.

THE ROLE OF OPERATIONS MANAGEMENT

We will start by considering that the role of operations management is to manage the transformation of an organization's inputs into finished goods and services (Figure 1.1).

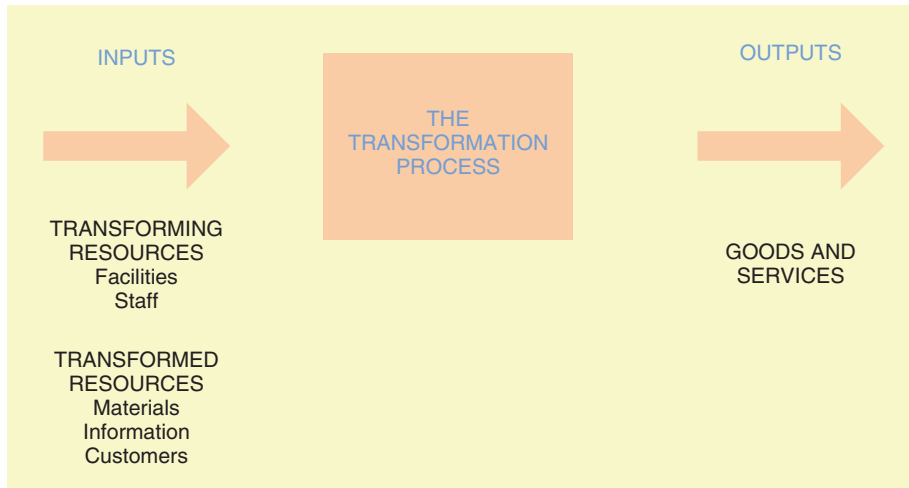


Figure 1.1: The Role of Operations Management.

The input activity involves two categories of resources. Transforming resources are the elements that act on, or carry out, the transformation process on other elements. The two main types of transforming resources are:

- Facilities, such as buildings, equipment and process technology. The management of these operations' resources is covered in Chapters 3 to 8.
- Staff, all the people involved in the operations process. In services the customer may well be involved as a transforming resource. Think of a fast-food restaurant where customers are expected to order the food and take it to their table and clear up afterwards. The management of human resources in operations is covered in Chapter 9.

The nature and mix of the transforming resources will differ between operations. The transformed resources, which are the elements acted on by the transforming resources, give the operations system its purpose or goal. The three main types of transformed resource, covered in Chapter 6, are:

- *Materials*. These can be transformed either physically (for example, manufacturing), by location (for example, transportation), by ownership (for example, retail) or by storage (for example, warehousing).
- *Information*. This can be transformed by property (for example, by accountants), by possession (for example, market research), by storage (for example, libraries), or by location (for example, telecommunications).

- *Customers.* They can be transformed either physically (for example, by hairdressers), by storage (for example, hotels), by location (for example, airlines), by physiological state (for example, hospitals), or by psychological state (for example, entertainment).

The transformation process itself will transform the material, information and customer resources in the way described above in order to produce goods and services.

OPERATIONS WITHIN THE ORGANIZATION

So far we have dealt with providing an overview of operations itself. This section discusses the role of operations in relation to other areas within the organization. Three of the most important functional areas in an organization can be classified as the operations, marketing and finance functions. The marketing function works to find and create demand for the company's goods and services by understanding customer needs and developing new markets. The need for marketing and operations to work closely together is particularly important as the marketing function will provide the forecast of demand from which operations can plan sufficient capacity in order to deliver goods and services on time. The finance function is responsible for obtaining and controlling funds and covering decisions such as investment in equipment and other operations resources such as personnel and materials.

Other functions that play a supporting role in the organization include the human resources (HR) function, which will play a role in regards to recruitment and labour relations; the research and development (R&D) function, which generates and investigates the potential of new ideas, and the information technology (IT) department, which supplies and coordinates the computer-based information needs of the organization.

The relationship between functions can be seen as a number of subsystems within the system called the 'organization'. Thus each function (such as marketing) can be treated using the same input/process/output transformation model as the operations function. In other words each function within the organization can be treated as performing an operations activity, as they are transforming inputs into outputs. This implies that every part of the organization is involved in the operations activity (to an internal or external customer) and indeed the topic of process management (Chapter 8) is an indication of how operations concepts are used across the organization.

THE PROCESS VIEW OF OPERATIONS

The view of the organization as a number of functions has been criticized. Melan (1993) considers the following conditions are usually built into the functional structure.

- Rewards systems that promote values and support the objectives of the functional department rather than the business in its entirety.
- Group behaviour, which encourages a strong loyalty within the department and an 'us-versus-them' attitude toward other departments within the firm.
- A high degree of decentralization, creating 'firms within the firm', each with its own agenda.

These and other deficiencies of the functional organization have led to a move away from considering business as a set of discrete functional areas and towards a view of the organization as consisting of sets of processes that link together in order to meet customer needs. Each process can be treated using the input/process/output transformation model as with the functional perspective, but there is a clear emphasis on breaking down the barriers between departments and ensuring that output meets customer requirements. Processes can be carried out by separate individuals (individual processes), contained within a department (functional processes) or can occur in several functional areas (cross-functional processes).

In functional terms the processes would be situated in areas such as operations, marketing and finance but from the customer's view the value they gain is dependent on the performance of the set of linked processes involved in the delivery of the product/service. The term 'value added' is used to denote the amount of value a process creates for its internal or external customer. The set of processes used to create value for a customer is often called the **value chain** (Porter and Millar, 1985). The value chain includes primary processes that directly create the value the customer perceives and support processes that assist the primary process in adding value. The key issue is that the configuration of the value chain should be aligned with the particular way the organization provides value to the customer. The design of operations from a process perspective is covered in Chapter 8.

Value chain

The value chain is the set of processes used to create value for a customer.

SERVICE OPERATIONS MANAGEMENT

Operations management has been historically associated with manufacturing industry but there has been a shift in its theory and practice to incorporate service systems. This is partly due to the importance of the service industry, which accounts for an

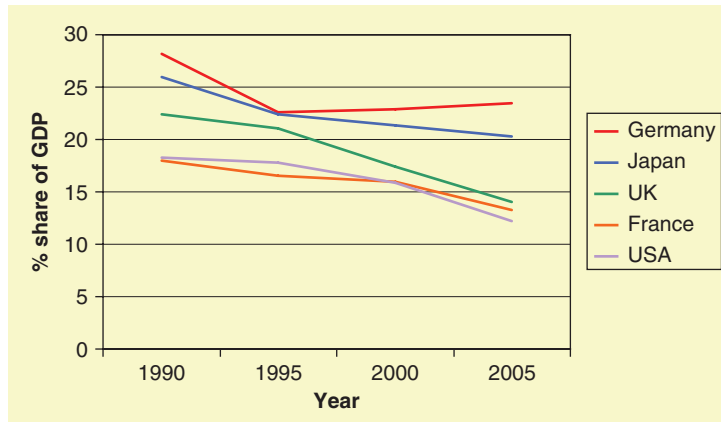


Figure 1.2: Manufacturing's Percentage Share of GDP in Period 1990 to 2005 in Selected Countries.

Source: United Nations Conference on Trade and Development (2008).

increasing proportion of the output of industrialized economies. In developed countries manufacturing output has generally fallen steadily as a proportion of GDP. This can be seen from Figure 1.2.

Case Study 1.2 at the end of the chapter outlines some of the reasons behind the shift from manufacturing to service output in the UK. The case study provides evidence that some of the decline in manufacturing output is not because these manufacturers have gone out of business but because they have reinvented themselves as service providers. The concept of **servitization** involves companies moving from being manufacturers with 'add-on' services to service companies whose output includes manufactured products.

It is difficult to measure the size of the service sector accurately because there is some disagreement about what constitutes the service sector but in the widest sense it can be seen as organizations that do not fall into what the economists call the primary sector (farming, forestry and fishing) or secondary sector (industries including manufacturing, mining and construction). Thus private-sector activities include retail, restaurants, hotels, transport and business services (this includes accounting, legal and computer services). Public sector service activities include health, defence, education and administration. Table 1.2 provides a classification of the service and nonservice sectors and indicates how their share of output, measured as gross value added (GVA), has changed in the UK over a 10-year period.

It can be seen from Table 1.2 that the service sector has risen as a share of output in the UK from around two-thirds in 1996 to three-quarters in 2006. The increasing prominence of the service sector in the economies of developed countries is due to an increase in what are termed consumer services and producer services.

Servitization

Servitization involves companies moving from being manufacturers with 'add-on' services to service companies whose output includes manufactured products.

Sector	Output (GVA) share (%)		Change in output (%)
	2006	1996	
Nonservices	24.9	33.2	− 8.3
Manufacturing	13.2	21.1	− 7.9
Mining and quarrying	2.4	2.9	− 0.4
Electricity, gas and water	2.7	2.3	0.4
Agriculture, forestry and fishing	0.9	1.8	− 0.8
Construction	5.7	5.1	0.6
Services	75	66.3	8.7
Real estate, renting and business services	24.8	19.1	5.7
Wholesale and retail trade	12.1	11.6	0.5
Financial intermediation (adjusted for FISIM)	4.4	3.2	1.2
Health and social work	7.3	6.4	0.9
Transport, storage and communications	7.2	7.8	− 0.6
Education	5.6	5.4	0.2
Other social and personal services	5.4	4.3	1.1
Public administration and defence	5.1	5.8	− 0.7
Hotels and restaurants	3.1	2.7	0.5

Table 1.2: Output (GVA) Share Percentage for Nonservices and Services in the UK.

Note: FISIM = financial intermediation services, independently measured, reported in Department for Business Enterprise and Regulatory Reform (BERR) (2008).

Source: Dye and Sosimi (2006).

Consumer services are services aimed at the final consumers and these have risen in line with people's increasing disposable income in developed countries. Once expenditure on essentials such as food and shelter has been accounted for, people will then spend on purchases such as travel, hotels, restaurants and other social and personal services.



Producer services are used in the production and delivery of goods and services and constitute firms providing services to other businesses such as consultancy advice, legal advice and IT support (classified under business services) and transportation and other facilities. The rise of producer services indicates that although the share of manufacturing is declining, it still plays an important part in a nation's economy. This is because many of the producer services are actually in business to provide services to manufacturers as well as other service providers. Many of the services that are now outsourced were once undertaken by manufacturers themselves and were thus formerly classified as part of the manufacturing sector.

The main reason for the decline in manufacturing in developed countries is often assumed to be competition from countries with lower labour costs. On the other hand

services are often assumed to be required in the location they are consumed so cannot be outsourced overseas in the same way production activities are. Actually the provider and user of the service may not be required to move to the location of the consumption of the service as in 'separated services' such as the media channels of television and newspapers, Internet sites for downloading music and call-centre services. Generally, however, either the producer is required to move to the location of consumption in 'demand-located services' (for example management consultancy) or the user is required to move to the location of consumption in 'provider-located services' (for example hotels and hospitals). Some services, termed 'peripatetic services', require both the provider and user of the service to move their location to consume the service (for example trade shows and antique fairs). Users may be prepared to travel overseas for some services, such as medical treatments, but generally services need to be based near their users to be competitive and to meet local needs.

Types of Service Operation

In order to assess the challenges for operations in managing services it is useful to determine the characteristics of different services. It is useful to distinguish between the design of the service (Chapter 7) and the design of the system that delivers the service (Chapter 8). Services themselves can be classified by their **tangibility**, while the way they are delivered can be classified by their simultaneity.

Tangibility

If goods are tangible, they are physical things that you can touch. A service is intangible and can be seen as a process that is activated on demand.

Classifying Services by Tangibility

This is the most commonly used distinction between goods and services. Goods are tangible – they are physical things that you can touch. A service is intangible and can be seen as a process that is activated on demand. In reality, both goods and services have both tangible and intangible elements and can be placed on a continuum ranging from low to high intangibility. For example, the food in a fast-food restaurant is a major tangible element of the service. The food in a restaurant is still an important element, but other intangible elements such as waiter service and décor are important factors too. In fact most operations systems produce a mixture of goods and services. Most goods have some supporting service element (for example a maintenance contract with a new washing machine), called a facilitating service; many services will have supporting goods (for example a report provided by a management consultant), termed a facilitating good. More information on the design of the service package (the bundle of goods and services) is given in Chapter 7 on product and service design.

The fact that services are intangible implies another important characteristic: **perishability**. A service is not a physical thing that can be stored, but is a process, so it must be consumed when it is produced or it will perish. The service provided by an empty seat in a restaurant or by an empty seat on an aircraft cannot be stored for use

Perishability

Perishability refers to the fact that because a service is not a physical thing that can be stored, but is a process, it must be consumed when it is produced or it will perish.

later. Thus revenue lost from these unused resources can never be recovered. This would not be a problem if the demand (in terms of volume and timing) for a service could be accurately determined and service capacity provided to match this. However, this is unlikely to be the case and unlike most goods, which can be stored if demand is lower than capacity to be used when demand is greater than capacity, services must always attempt to match supply and demand. This topic is considered in more detail in Chapter 11 on capacity management.

Classifying Service Delivery by Simultaneity

Simultaneity relates to the characteristic that services are produced and consumed simultaneously. This means the service provider and customer will interact during the service delivery process. The amount of interaction is termed the **degree of customer contact**. In fact the customer is unlikely to be a passive receiver of the service but will generally be involved to a greater or lesser extent in the actual delivery of the service itself. For instance a supermarket requires the customer to choose and transport the goods around the store and queue at an appropriate checkout till. However, it should not be assumed that all services are consumed at the point of production (for example, financial services) and that employees in a service operation have to deal directly with a customer. For the supermarket example, the check-out till is an example of high customer contact but stores' personnel may not have to deal directly with the customer at all.

A distinction in services is denoted by 'back-office' tasks, which add value to the inputs of the service operation, and 'front office' tasks, which deal with the customer both as an input and output of the operation (Figure 1.3).

Different organizations will have a different balance between front and back office operations. A front-office-based operation will be focused on the service experience of the customer and this is where most value will be added. Some

Simultaneity

Simultaneity relates to the characteristic that services are produced and consumed at the same time.

Degree of customer contact

The degree of customer contact relates to the amount of interaction between the service provider and customer during the service delivery process.

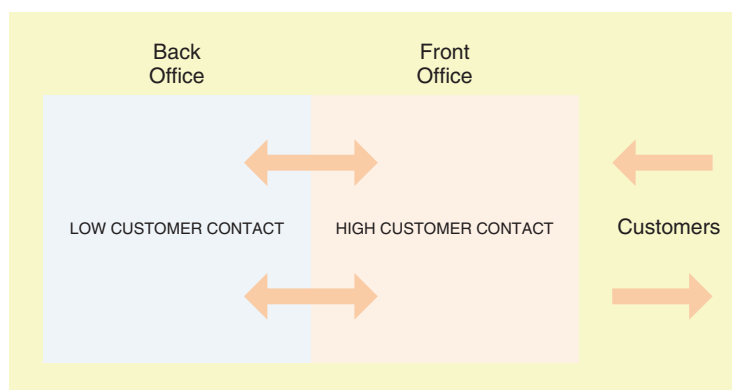


Figure 1.3: Front Office and Back Office in Operations Management.

traditional back-office focused organizations, such as manufacturers, are increasing the role of service experience and thus their front-office operations. This is because they judge that the ability to differentiate on the service aspect of their offering may provide a longer term source of competitive advantage than they can achieve by differentiating with the goods themselves. Some other organizations, however, are moving in the opposite direction and recognizing that customer value is being added by the tangible aspect of the service package delivered by the back office operations. For example budget airlines have eliminated many front-line service aspects of the flight experience and focused on the transportation of customer process itself.

Heterogeneity

Heterogeneity refers to the interaction of the customer, service provider and surroundings causing variability in the performance of the service.

The fact that services require simultaneity and are produced and consumed simultaneously implies another important characteristic: **heterogeneity**. This refers to the interaction of the customer, service provider and surroundings causing variability in the performance of the service. From the perspective of the service provider, humans, by their nature, are likely to vary their actions and sometimes makes mistakes. Individual customers will also perceive the quality of the service differently and the context of the service encounter (for example the existence of queues or weather conditions) may also impact on the service. This variability in performance and perceptions may lead to difficulties in maintaining a consistent level of service quality.

Some services, termed mass services, which operate at high volume and low variety of outcome, attempt to reduce variability due to heterogeneity by standardizing the service. This can be achieved by using approaches such as training staff to follow standard procedures and using equipment to support the service delivery process. This approach may not be appropriate for professional services, which operate at low volume and high variety, because here the customer requires high levels of contact with the service provider and a customized service. Service types such as mass service and professional service are covered in more detail in Chapter 3.

THE STRATEGIC ROLE OF OPERATIONS

Market-based operations strategy

In a market-based approach to operations strategy the organization makes a decision regarding the markets and the customers within those markets that it intends to target.

Despite the term ‘operations’, operations management is not simply about the day-to-day (operational) running of an organization. Operations management does in fact have an important strategic role in ensuring that the management of the organization’s resources and processes move the organization closer to its long-term goals. Operations strategy can be seen from market-based and resource-based perspectives. Using a **market-based operations strategy**, the organization makes a decision regarding the markets and the customers within those markets that it intends to target. This market position is then translated into a

list of criteria or objectives, which define what kind of performance is required in order to successfully compete in the markets chosen.

Some examples of criteria for performance are fast delivery, a wide range of services or a low price. A **resource-based** view works from the inside-out of the firm, rather than the outside-in perspective of the market-based approach. Here an assessment of the operation's tangible and intangible resources and processes leads to a view of the operation's capability. More detail on operations strategy is provided in Chapter 2.

Resource-based operations strategy

In a resource-based approach to operations strategy an assessment of the operation's tangible and intangible resources and processes leads to a view of the operation's capability.

TECHNOLOGY AND OPERATIONS MANAGEMENT

Technology plays a key role in the transformation process for which operations is responsible. **Process technology** is used to help transform the three main categories of transformed resources which are materials, customers and information. One of the most widely used and useful process technologies is computer-aided design (CAD), which allows testing of product and service designs using computer-based drawings. Customer processing technology such as automated teller machines can reduce or eliminate the need for employee contact in customer-facing operations. Information technologies such as e-Business systems are having a major effect on how firms organize their supply chains and use their capacity. More details on process technology are provided in Chapter 6.

Process technology

Process technology is used to help transform the three main categories of transformed resources, which are materials, customers and information.

CASE STUDY 1.1

'First Bank' PLC

'First Bank' has recently begun to offer Internet banking to extend its range of services to the customer and decrease the demand on branch personnel. However, the web site has been experiencing difficulties with a slow response rate to customer inquiries. Demand for the Internet service has also been much lower than expected. As operations manager the company requires your view on the following issues:

Questions

1. What are the competitive consequences of 'pulling out' of Internet banking for the company?
2. What impact will a decision to 'pull out' of Internet banking have on the company in terms of future technology-based initiatives.
3. How can the bank improve customer take-up of its Internet banking initiative?

SUMMARY

- Operations management is about the management of the processes that produce or deliver goods and services.
- The operations system can be seen as a transformation process. It converts inputs known as transformed resources (classified as materials, information and customers) using transforming resources (classified as staff and facilities) into finished goods and services.
- An alternative to the functional perspective of an organization is a process view in which the organization is seen as consisting of a set of processes that link together to meet customer needs.
- Service organizations can be classified by their tangibility (the extent that they incorporate a physical thing that you can touch). The way services are delivered can be classified by their simultaneity (the extent that the service is produced and consumed at the same time).
- Service operations can be denoted by front-office tasks, which deal directly with the customer, and back-office tasks, which add value to the inputs of the service operation.
- Operations management has an important strategic role in ensuring that the management of the organization's resources and processes direct the organization closer to its long-term goals.
- Technology plays a key role in the transformation of materials, customers and information for which operations is responsible.

CASE STUDY 1.2

Manufacturing's Decline Partly Due to Services Shift

Up to a fifth of the decline in manufacturing's share of the UK economy could be attributable to a shift by production companies towards service activities in place of turning out goods, according to UK government statisticians. The

phenomenon of manufacturers undergoing a subtle metamorphosis so they become 'hybrid businesses' that combine production with services could explain why many individual companies regarded as manufacturers are

performing a lot better than the sector's generally gloomy macroeconomic data. Lord Kumar Bhattacharyya, director of the Warwick Manufacturing Group at the University of Warwick, and a highly regarded observer of manufacturing trends, says: 'The fact that many more manufacturers in the UK have gone into services is one reason many have been able to survive.' Since 1995 the share of manufacturing in the economy has shrunk from 20% to less than 15%. This is a change generally linked to the faster growth of services plus productivity improvements in manufacturing reducing the value of factory output by making goods cheaper. Another factor is the growing share of global manufacturing output accounted for by countries with cheaper labour costs. UK data on the split between manufacturing and services are assembled by the government's Office for National Statistics. It does this by asking companies to classify their output between the two activities. If a manufacturer has abandoned most of its UK-based manufacturing – but continues to function in the UK as a distributor or provider of other services such as repair and maintenance. The company can be recategorized and may officially no longer be considered a manufacturer. According to a senior government statistician, no one has properly accounted for how much service activity is now being done by companies formerly considered as 100% manufacturers but today are classed either as hybrids or wholly service businesses. The official said it was 'quite plausible' that as much as a fifth of the apparent relative decline

in manufacturing in the past 10 years could be explained by this shift.

One of the best examples of companies making such a shift is Pace Micro Technology, a West Yorkshire business, which is a world leader in digital set-top boxes for televisions. In the late 1990s it employed 1500 at its main site in Shipley, most of them in manufacturing. Today the company's UK manufacturing output is non-existent – all its production being done by contractors in low-cost countries – but continues to employ 450 on the site, mainly in design engineering and software. Output from the site is categorized as a distribution activity – sales of set-top boxes to retailers – while the value of the engineering work is captured also in an unclassifiable part of these distribution sales. In a similar way Alstom, a French engineering company that in the 1990s operated large factories in the UK producing power turbines and trains, today employs 5000 in Britain – all but about 350 of whom are involved in services such as designing new power systems or maintaining railway equipment while it is being operated by customers. Indesit, an Italian white goods company formerly known as Merloni and which makes the Hotpoint brand of domestic appliances, has 5500 workers in the UK, only 2000 of them in conventional factory jobs. The rest are in activities such as servicing appliances in people's homes, distribution and logistics, sales and running a call centre in Peterborough for customer problems. Marco Milani, chief executive of Indesit, says: 'Services are an extremely important part of what we do.' UK company Dialight is a world

leader in making light-emitting diodes – small electronic devices that can take the place of light bulbs and last a lot longer while providing more light. With most of its manufacturing in Mexico, it runs a plant in Newmarket, Cambridgeshire, employing 120. Most work is not in conventional manufacturing activities but jobs such as logistics and planning for the company's global operations. 'It's important to remember the work of a production company

goes a lot further than what people regard as manufacturing,' says Roy Burton, chief executive.

Source: Peter Marsh, *Financial Times*, 22 May 2006. Reproduced with permission.

Question

Discuss the main reasons given for the growth in services in the case study.

EXERCISES

1. Look at a recruitment web site or the recruitment section of a newspaper and locate three operations roles in job advertisements in the manufacturing industry and three in the service industry.
2. How would you distinguish between the fields of operations management and operations research?
3. Identify the main transformed and transforming resources for the types of organizations below:
 - fast food restaurant
 - hotel
 - university
 - food retailer
 - car manufacturer.
4. Explain the use of the process view of organizations.
5. What are the implications of moving tasks between the front office and back office areas of a service operation?
6. Explain the term heterogeneity as applied to service operations.

WEB EXERCISE

The UNCTAD web site (www.unctad.org) has a number of reports on the world economy. Visit the web site and from the UNCTAD handbook of statistics 2008 discover the value of the trade balance for developing and developed economies. Why do you think that the developed economies have such a high negative trade balance (imports are higher than exports)?

FURTHER READING

- Johnston, R.** and **Clark, G.** (2008) *Service Operations Management: Improving Service Delivery*, 3rd edn, Pearson Education Ltd.
- Slack, N., Chambers, S.** and **Johnston, R.** (2007) *Operations Management*, 5th edn, Pearson Education Ltd.
- Slack, N.** and **Lewis, M.** (2008) *Operations Strategy*, 2nd edn, Pearson Education Ltd.
- Van Looy, B., Gemmel, P.** and **Van Dierdonck, R.V.** (eds) (2003) *Services Management: An Integrated Approach*, 2nd edition, Pearson Education Ltd.
- Vonderembse, M.A.** and **White, G.P.** (2007) *Operations Management: Concepts, Methods and Strategies*, John Wiley & Sons, Ltd.

WEB LINKS

Selected List of Operations Management Web Sites

- www.ame.org (accessed 23 September 2008). The Association for Manufacturing Excellence. Events and publications aimed at improving productivity.
- www.apics.org (accessed 23 September 2008). The Association for Operations Management. Resources such as industry news in operations management.
- www.brint.com (accessed 23 September 2008). An extensive search engine for business technology resources.
- www.eiasm.org (accessed 23 September 2008). European Institute for Advanced Studies in Management (ELASM). International network for management research and teaching.
- www.euroma-online.org (accessed 23 September 2008). European Operations Management Association (EUROMA). Leading association for operations managers. Contains information on conferences, workshops and publications.
- www.informs.org (accessed 23 September 2008). Institute for Operations Research and Management Science. Resources such as web guides, journals and links to societies in the field of operations research.
- www.iomnet.org.uk (accessed 23 September 2008). Institute of Operations Management. A professional body for those involved in operations management in the UK. Contains links to online resources.

- www.manufacturinginstitute.co.uk (accessed 23 September 2008). The Manufacturing Institute contains news and events concerning manufacturing in the UK.
- www.mas.berr.gov.uk (accessed 23 September 2008). Manufacturing Advisory Service. Department for Business Enterprise and Regulatory Reform (BERR) site for UK manufacturers.
- www.mhhe.com/omc (accessed 23 September 2008). Operations Management Center. Resources regarding operations management for students and professionals.
- www.poms.org (accessed 23 September 2008). Production and Operations Management Society. International society providing resources such as journals and encyclopedia of operations management terms.
- www.sussex.ac.uk/Users/dt31/TOMI/ (accessed 23 September 2008). The Technology and Operations Management Index (TOMI) portal.
- www.unctad.org (accessed 23 September 2008). United Nations Conference on Trade and Development. Provides links to a number of reports regarding world trade and economic development issues.

Selected List of Operations Management Academic Journals

- <http://jsr.sagepub.com/> (accessed 23 September 2008). *Journal of Service Research*.
- www.emeraldinsight.com/ijopm.htm (accessed 23 September 2008). *International Journal of Operations and Production Management* (IJOPM).
- www.poms.org/journal (accessed 23 September 2008). *Production and Operations Management* (POM).
- www.sciencedirect.com/science/journal/01664972 (accessed 23 September 2008). *Technovation*.
- www.sciencedirect.com/science/journal/02637863 (accessed 23 September 2008). *International Journal of Project Management*.
- www.sciencedirect.com/science/journal/02726963 (accessed 23 September 2008). *Journal of Operations Management* (JOM).
- www.sciencedirect.com/science/journal/07376782 (accessed 23 September 2008). *Journal of Product Innovation Management*.
- www.sciencedirect.com/science/journal/09255273 (accessed 23 September 2008). *International Journal of Production Economics*.
- www.sciencedirect.com/science/journal/09697012 (accessed 23 September 2008). *European Journal of Purchasing and Supply Management*.

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- Department for Business Enterprise and Regulatory Reform (BERR) (2008) *BERR Report 'Globalization and the Changing UK Economy'*, www.berr.gov.uk/files/file44332.pdf (accessed 22 September 2008).
- Dye, J. and Sosimi, J. (eds) (2006), United Kingdom National Accounts: The Blue Book 2006, Office for National Statistics, HMSO, http://www.statistics.gov.uk/downloads/theme_economy/BlueBook2006.pdf (accessed 9 October 2008).

- Melan, E.H.** (1993) *Process Management: Methods for Improving Products and Services*, McGraw-Hill, New York.
- Porter, M.E.** and **Millar, V.E.** (1985) How information gives you competitive advantage, *Harvard Business Review* . July–August, 149–60.
- UNCTAD (2008), UNCTAD Handbook of Statistics 2008, <http://stats.unctad.org/handbook/ReportFolders/ReportFolders.aspx> (accessed 9 October 2008).