

Operations management and performance



Introduction



Operations management is about how organisations create and deliver services and products. Everything you wear, eat, sit on, use, read or knock about on the sports field comes to you courtesy of the operations managers who organised its creation and delivery. Every app you use, every treatment you receive at the hospital, every service you expect in the shops and every lecture you attend at university – all have been created by operations managers. The people who supervised their creation and delivery may not always be called ‘operations managers’, but that is what they are. And that is what this text is concerned with – the tasks, issues and decisions of those operations managers who have made the services and products on which we all depend. This is an introductory chapter, so we will examine what we mean by ‘operations management’, how we judge their performance, how they are all similar yet different, and what it is that operations managers do (see Figure 1.1).

Key questions

1.1 What is operations management?

1.2 What is the input–transformation–output process?

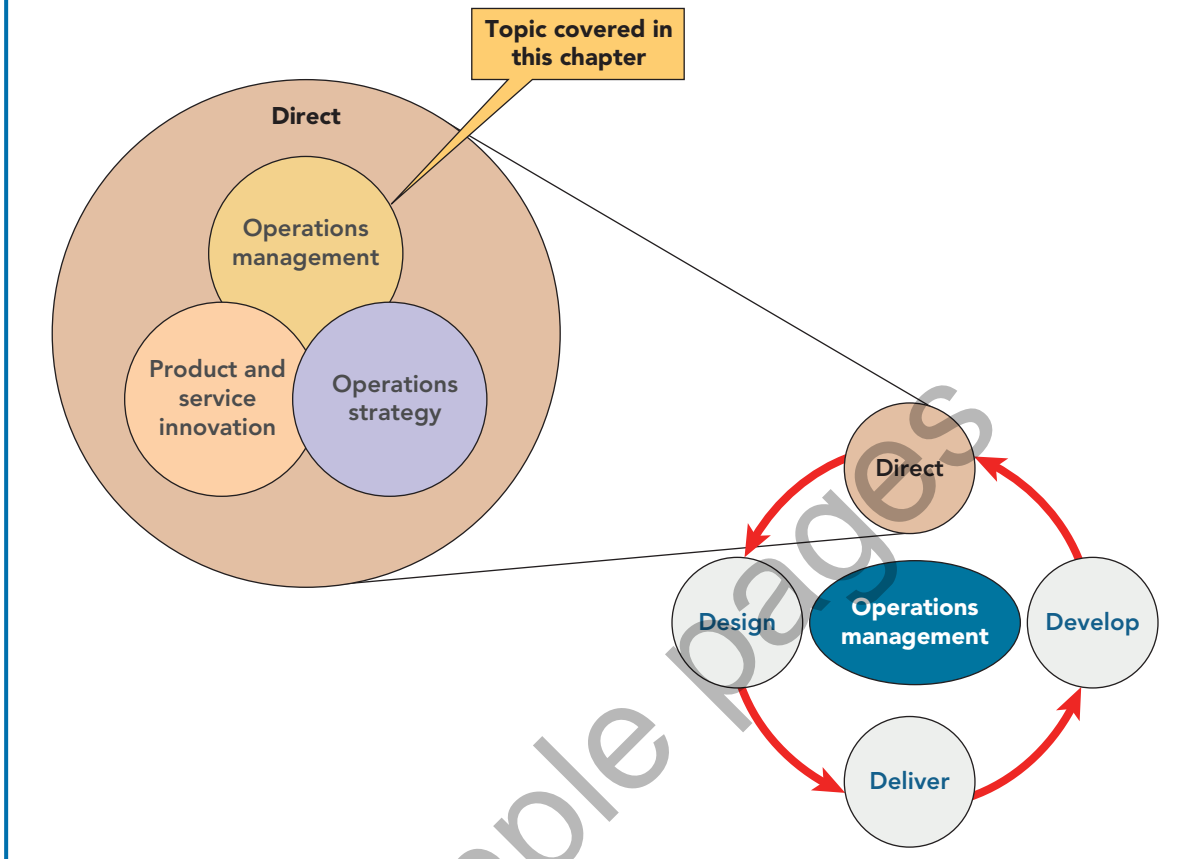
1.3 Why is operations management important to an organisation’s performance?

1.4 What is the process hierarchy?

1.5 How do operations (and processes) differ?

1.6 What do operations managers do?

FIGURE 1.1 This chapter is an introduction to operations and performance



1.1 What is operations management?

Operations management is the activity of managing the resources that create and deliver services and products. The operations function is the part of the organisation that is responsible for this activity. Every organisation has an **operations function** because every organisation creates some mix of services and products. However, not all types of organisations will necessarily call the operations function by this name. (Note in addition that we also use the shorter terms 'the operation' or 'operations' interchangeably with the 'operations function'.) **Operations managers** are the people who have responsibility for managing some, or all, of the resources that comprise the operations function. In some organisations, the operations manager could be called by some other name. For example, they might be called the 'fleet manager' in a distribution company, the 'administrative manager' in a hospital, or the 'store manager' in a supermarket.

Operations principle
 All organisations have 'operations' that produce some mix of services and products.



Operations in practice



LEGOLAND® and LEGO®: both rely on their operations managers

They may seem to be very different businesses, even though they partly share the same name. LEGOLAND is a world-renowned chain of location-based family leisure theme parks, and LEGO is one of the best-known makers of learning toys. But look in more detail and they share many common operations management activities. It is by looking at these activities that we can understand some of the similarities and differences between operations.

LEGOLAND¹

Theme parks are a multi-billion-dollar industry. And one of the best-known brands in the industry is LEGOLAND®, whose LEGO-themed attractions hotels and accommodation are aimed primarily at families with children aged 3 to 12. LEGOLAND has parks in seven countries and across three continents.

Location is important. The first park opened over 60 years ago, near the LEGO factory in Billund, Denmark. LEGOLAND Deutschland is in Bavaria close to Switzerland and Austria, all markets with a significant LEGO following. All LEGOLAND parks are operated by the UK-based Merlin Entertainments, which also operates other branded

attractions in the United Kingdom, Italy and Germany, such as Madame Tussauds, The London Eye, Warwick Castle and Alton Towers. What all have in common is that they provide their visitors with an 'experience'. Every stage of each attraction that customers (usually referred to as 'guests') move through must be designed to create an intense or immersive experience centred on theming around movie or television characters, or in the case of LEGOLAND, LEGO intellectual property. The individual attractions in theme parks require considerable investment, often using sophisticated technology. Maintaining the utilisation of these attractions means trying to manage the flow of guests around the park so that they are queuing for as little time as possible. However, public holidays, seasons and weather will all impact on the number of guests wanting to visit each park. But no matter how busy a park is, the quality of its guests' satisfaction with the experience is an important part of LEGOLAND'S operations management. What it calls its 'Guest Obsession' with creating smooth and memorable experiences for its guests

includes regularly monitoring guest satisfaction scores.

LEGO²

The LEGO Group, a privately held, family-owned company, with headquarters in Billund, Denmark, is one of the leading manufacturers of play materials. LEGO bricks are manufactured at the Group's factories, located to be near its key global markets. The company's success is founded on a deceptively simple idea. One LEGO brick is unremarkable but put one or two or more together and possibilities start to emerge. For example, there are more than 915 million possible ways of arranging six standard four-by-two bricks.³ With all the elements, colours and decorations in the LEGO range, the total number of combinations becomes very large indeed. Yet however many bricks you assemble, and irrespective of what colour or set they are from, they will always fit together perfectly because they are made to very high levels of precision and quality. The company's motto is 'Only the best is good enough'. At the Billund operation, 60 tons of plastic is processed every 24 hours, with its moulding machines supplied by a complex arrangement of

tubes. This stage is particularly important, because every LEGO piece must be made with tolerances as small as 10 micrometres. The moulds used by these machines are expensive, and each element requires its own mould. Robot trolleys travel between the machines, picking up boxes and leaving empty ones, an investment in automation that means that few people are required. In the packaging process the LEGO sets take their final form. The system knows exactly how much each packed box should weigh at any stage and any deviation sets off an alarm. Quality assurance staff perform frequent inspections and tests to make sure the toys are robust and safe. For every 1 million LEGO

elements, only about 18 (that's 0.00002 per cent) fail to pass the tests. In addition, throughout the process, the company tries to achieve high levels of environmental sustainability. Plastic is extensively recycled in the factory.

Operations management is central to both businesses

Both LEGOLAND, which provides an entertainment service, and LEGO, which manufactures LEGO bricks, depend on their operations managers to survive and prosper. It is they who design the stages that add value to the guests or the plastic that flows through the operation. They manage the activities that create services and products, they

support the people whose skill and efforts contribute to adding value for both customers and the business itself. They attempt to match the operation's capacity with the demand placed upon it. They control quality throughout all the operation's processes. And they transform each organisation's strategy into practical reality. Without effective operations management, neither business would be as successful. Of course, there are differences between the two operations. One 'transforms' its guests, the other 'transforms' plastic. Yet they share a common set of operations management tasks and activities, even if the methods used to accomplish the tasks are different. ●●●

If you want a flavour of some of the issues involved in managing a modern successful operation, look at the 'Operations in practice' example, 'LEGO-LAND® and LEGO®: both rely on their operations managers'. It illustrates how important the operations function is for any company whose reputation depends on creating high-quality, sustainable and profitable products and services. Their operations and their offerings are innovative, they focus very much on customer satisfaction, they invest in the development of their staff, and they play a positive role in fulfilling their social and environmental responsibilities. All these issues are (or should be) high on the agenda of any operations manager in any operation. Continuing this idea, Table 1.1 shows just some of the activities of the operations function for various types of organisations.

Operations management in not-for-profit organisations

Terms such as 'competitive advantage', 'markets' and 'business', which are used in this text, are usually associated with companies in the for-profit sector. Yet operations management is also relevant to organisations whose purpose is not primarily to earn profits. Managing the operations in an animal welfare charity, hospital, research organisation or government department is essentially the same as in commercial organisations. Operations must take the

TABLE 1.1 Some activities of the operations function in various organisations

Internet service provider	Fast-food chain	International aid charity	Furniture manufacturer
<ul style="list-style-type: none"> ▶ Maintain and update hardware ▶ Update software and content ▶ Respond to customer queries ▶ Implement new services ▶ Ensure security of customer data 	<ul style="list-style-type: none"> ▶ Locate potential sites for restaurants ▶ Provide processes and equipment to produce burgers, etc. ▶ Maintain service quality ▶ Develop, install and maintain equipment ▶ Reduce impact on local area ▶ Reduce packaging waste 	<ul style="list-style-type: none"> ▶ Provide aid and development projects for recipients ▶ Provide fast emergency response when needed ▶ Procure and store emergency supplies ▶ Be sensitive to local cultural norms 	<ul style="list-style-type: none"> ▶ Procure appropriate raw materials and components ▶ Make sub-assemblies ▶ Assemble finished products ▶ Deliver products to customers ▶ Reduce environmental impact of products and processes

same decisions – how to create and deliver services and products, invest in technology, contract out some of their activities, devise performance measures, improve their operations performance, and so on. However, the strategic objectives of not-for-profit organisations may be more complex and involve a greater emphasis on political, economic, social or environmental objectives. Nevertheless, most of the topics covered in this text have relevance to all types of organisations, even if some terms may have to be adapted.

The new operations agenda

Changes in the business environment have had a significant impact on the challenges faced by operations managers. Some of them are in response to changes in demand. Some are in response to expanded technological possibilities. Some are in response to customers' attitudes to social and environmental issues. Operations managers have had to adjust their activities to cope, especially in the following areas:

- ★ **New technologies** In both manufacturing and service industries, **process technologies** are changing fast.
- ★ **Different supply arrangements** Some globalised **supply chains** have become increasingly vulnerable.
- ★ **Increased emphasis on social and environmental issues** Customers, staff, and even investors, have been developing an increased ethical and environmental sensitivity.

Operations principle

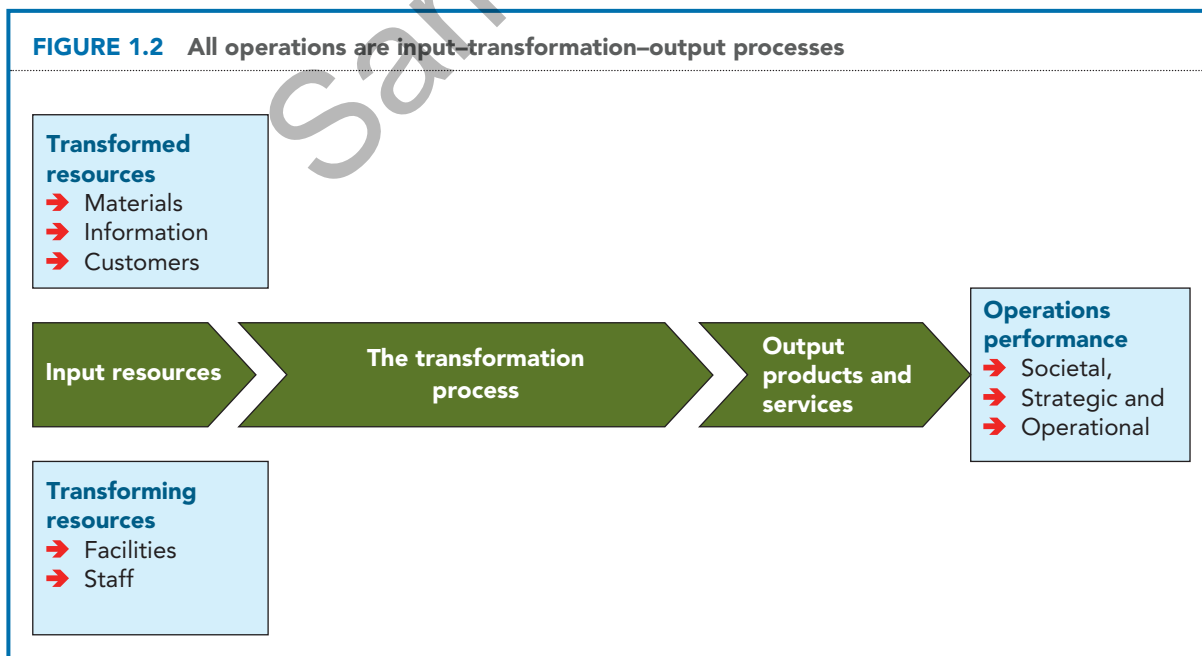
Operations management is at the forefront of coping with, and exploiting, developments in business and technology.

1.2 What is the input–transformation–output process?

All operations create and deliver services and products by changing inputs into outputs using an 'input–transformation–output' process. Figure 1.2 shows this general **transformation process model** that is the basis of all operations. Put simply, operations take in a set of **input resources** that are used to transform something, or are transformed themselves, into outputs of services and products. And although all operations conform to this general input–transformation–output model, they differ in the nature of their specific inputs and outputs. So, if you stand far enough away from a hospital or a vehicle plant, they might look similar, but move closer and clear differences do start to emerge. One is a service operation delivering 'services' that change the physiological or psychological condition of patients; the other is a manufacturing operation creating and delivering 'products'. What is inside each operation will also be different. The hospital contains diagnostic, care and therapeutic processes whereas the motor vehicle plant contains metal-forming machinery and assembly processes. Perhaps the most important difference between the two operations, however, is the nature of their inputs. The hospital transforms the customers themselves. The patients form part of the input to, and the output from, the operation. The vehicle plant transforms steel, plastic, cloth, tyres and other materials into vehicles.

Operations principle
All processes have inputs of transforming and transformed resources that they use to create products and services.


FIGURE 1.2 All operations are input–transformation–output processes



Inputs to the process

One set of inputs to any operation's processes are **transformed resources**. These are the resources that are treated, transformed or converted in the process. They are usually a mixture of the following:

- ★ **Materials** Operations that process materials could do so to transform their physical properties (shape or composition, for example). Most manufacturing operations are like this. Other operations process materials to change their location (parcel delivery companies, for example). Some, like retail operations, do so to change the possession of the materials. Finally, some operations, such as warehouses, store materials.
- ★ **Information** Operations that process information could do so to transform their informational properties (that is, the purpose or form of the information); accountants do this. Some change the possession of the information: for example, market research and social media operations aggregate and sell information. Some store the information, such as archives and libraries. Finally, some operations, such as telecommunication companies, change the location of the information.
- ★ **Customers** Operations that process customers might change their physical properties in a similar way to materials processors: for example, hairdressers or cosmetic surgeons. Some, like hotels, store (or more politely, accommodate) customers. Airlines and mass rapid transport transform the location of their customers, while hospitals transform their physiological state. Some are concerned with transforming their psychological state: for example, most entertainment services such as music, theatre, television, radio and theme parks. But customers are not always simple 'passive' items to be processed. They can also play a more active part: for example, they create the atmosphere in a restaurant; they provide the stimulating environment in learning groups in education, and so on.



Operations principle
Transformed resource inputs to a process are materials, information or customers.

Some operations have inputs of materials *and* information *and* customers, but usually one of these is dominant. For example, a bank devotes part of its energies to producing printed statements by processing inputs of material, but no one would claim that a bank is a printer. The bank also is concerned with processing inputs of customers at its branches and contact centres. However, most of the bank's activities are concerned with processing inputs of information about its customers' financial affairs. As customers, we may be unhappy with badly printed statements and we may be unhappy if we are not treated appropriately in the bank. But if the bank makes errors in our financial transactions, we suffer in a far more fundamental way. Table 1.2 gives examples of operations with their dominant transformed resources.

The other set of inputs to any operations process are **transforming resources**. These are the resources that act upon the transformed resources. There are two types, which form the 'building blocks' of all operations:

TABLE 1.2 Dominant transformed resource inputs of various operations

Predominantly processing inputs of materials	Predominantly processing inputs of information	Predominantly processing inputs of customer
▶ All manufacturing operations	▶ Accountants	▶ Hairdressers
▶ Mining companies	▶ Bank headquarters	▶ Hotels
▶ Retail operations	▶ Market research companies	▶ Hospitals
▶ Warehouses	▶ Financial analysts	▶ Mass rapid transport
▶ Postal services	▶ News services	▶ Theatres
▶ Container shipping lines	▶ University research unit	▶ Theme parks
▶ Trucking companies	▶ Telecoms companies	▶ Dentists

- ★ **Facilities** the buildings, equipment, plant and process technology of the operation;
- ★ **Staff** the people who operate, maintain, plan and manage the operation. (Note we use the term 'staff' to describe all the people in the operation, at any level.)

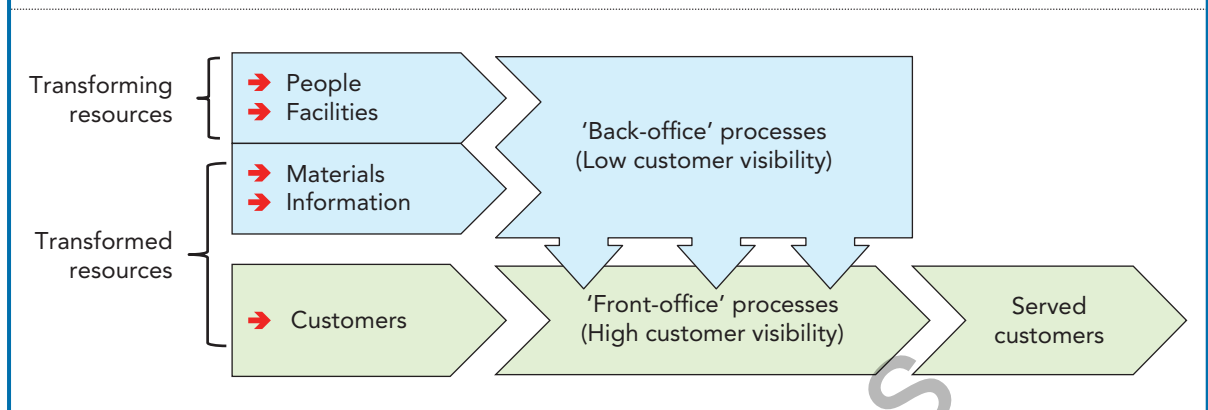
The exact nature of both facilities and staff will differ between operations. To a five-star hotel, its facilities consist mainly of 'low-tech' buildings, furniture and fittings. To a nuclear-powered aircraft carrier, its facilities are 'high-tech' nuclear generators and sophisticated electronic equipment. Staff will also differ between operations. Most staff employed in a factory assembling domestic refrigerators may not need a very high level of technical skill. In contrast, most staff employed by an accounting company are, hopefully, highly skilled in their own particular 'technical' skill (accounting). Yet although skills vary, all staff can make a contribution. An assembly worker who consistently misassembles refrigerators will dissatisfy customers and increase costs just as surely as an accountant who cannot add up. The balance between facilities and staff also varies. A computer chip manufacturing company, such as Intel, will have significant investment in physical facilities. A single chip fabrication plant will cost billions of dollars, so operations managers will spend a lot of their time managing their facilities. Conversely, a management consultancy firm depends largely on the quality of its staff. Here operations management is largely concerned with the development and deployment of consultant skills and knowledge.

Operations principle
 All processes have transforming resources of facilities (equipment, technology, etc.) and people.

Front- and back-office transformation

A distinction that is worth noting at this point, mainly because it has such an impact on how transforming resources are managed, is that between

FIGURE 1.3 When the main transformed resource are the customers themselves, it is useful to distinguish between 'front-office' processes that act on customers directly and 'back-office' processes that provide indirect services



'front-' and 'back-office' transformation. The **'front-office'** (or 'front-of-house') parts of an operation are those processes that interact with (transform) customers. **'Back-office'** (or 'back-of-house') operations are the processes that have little or no direct contact with customers but perform the activities that support the front office in some way. The distinction is illustrated in Figure 1.3. But, as implied by the figure, the boundary between front and back offices is not clean. Different processes within an operation could have different degrees of exposure (what we refer to later as 'visibility') to customers.

Outputs from the process

Operations create products and services, which are often seen as different. Products are physical things whereas services are activities or processes. Yet, although some services do not involve many physical products, and some manufacturers do not give much service, most operations produce some mixture of products and services, even if one predominates. For example, services like consultancies produce reports, hairdressers sell hair gel and food manufacturers give advice on how to prepare their products.

Products or services, or does it matter?

At a simple, level, a product is a physical and **tangible** thing (you can touch a car, or television or phone). By contrast, a service is an activity that usually involves interaction with a customer (as with a doctor) or something representing the customer (as with a package delivery service). For many years the accepted distinction between products and services was not confined to intangibility, but included other characteristics abbreviated to **'IHIP'**, standing for:



Operations in practice



Marina Bay Sands Hotel⁴

There are very few better examples of how back and front offices work together than the hotel industry. As customers, we naturally judge a hotel primarily on its front-office, client-facing, staff and facilities, but without effective back-office operations, customers would soon find that their front-office experience would be very much affected. This is certainly true for the Marina Bay Sands hotel in Singapore. Located in the heart of Singapore's Central Business District, Marina Bay Sands is an integrated, multi-award-winning, luxury resort owned by the Las Vegas Sands corporation, incorporating a hotel with over 2,500 rooms, a huge convention and exhibition centre, restaurants, a shopping mall, museum, two large theatres and the world's largest atrium casino. The hotel's three towers are crowned by the spectacular Sands SkyPark, which offers a 360-degree view of Singapore's skyline. It is home to lush gardens, an infinity edge swimming pool and an observation deck.

But the meticulous service provided by the hotel's highly trained front-of-house staff could not happen without the many back-of-house processes that customers do not always notice. Some of these processes are literally invisible to customers, for example those that keep the accounts, or those that maintain the hotel's air-conditioning systems, or the dim sum preparation (dim sum are steamed dumplings served in small, bite-sized portions – specialist chefs prepare 5,000 individual pieces every day). These processes are all important, and mass operations in their own right. Some back-of-house departments rely more on technology. The hotel's laundry must clean and press 4,000 pool towels every day, as well as thousands of items of room linen. Which is a problem for an organisation whose sustainability policy commits it to minimising its use of water. It took an investment of over £10 million in water-saving technology to reduce the hotel's usage by 70 per cent. Other

back-of-house operations have a direct impact on how customers view the hotel. For example, the wardrobe department that keeps the hotel's over 9,000 staff looking smart is reputed to be the most high-tech in the world. Its 18 automated conveyors each have slots for 620 individual items of uniform, all of which have individual identification chips so that they can be tracked. Staff enter their number into a keypad, and, behind the scenes, the conveyor system automatically delivers the uniform. Some processes straddle the front-of-house/back-of-house divide. The valet parking operation parks up to 200 cars each hour in its 2,500 parking spaces, and retrieves them in a target retrieval time of seven minutes. Housekeeping cleans, tidies and stocks all the bedrooms. The hotel's 50 butlers serve the more exclusive suites and cater for a wide variety of demands (one guest asked them to arrange a wedding banquet at four hours' notice). It is a role that demands dedication and attention to detail. ● ● ●

- ★ Intangibility, in that they are not physical items, making it difficult to define the 'boundary' of the less tangible elements of service so it becomes important to manage customers' expectations as to what the service comprises.
- ★ Heterogeneity, in that they are difficult to standardise because each time a service is delivered, it will be different because the needs and behaviour of customers will, to some extent, vary. Customers could ask for elements of service that may be outside the operation's capabilities, so, staff must be trained to cope with a wide variety of requests.
- ★ Inseparability, in that their production and consumption are simultaneous. The service provider is often physically present when the customer consumes it. Production and consumption are simultaneous. So, to meet all demand, operations must have sufficient **capacity** in place to meet demand *as it occurs*.
- ★ Perishability, in that they cannot be stored because they have a very short 'shelf life'. They may even perish in the very instant of their creation, like a theatre performance. This means that an operation's output is difficult to store and ceases to have value after a relatively short time.

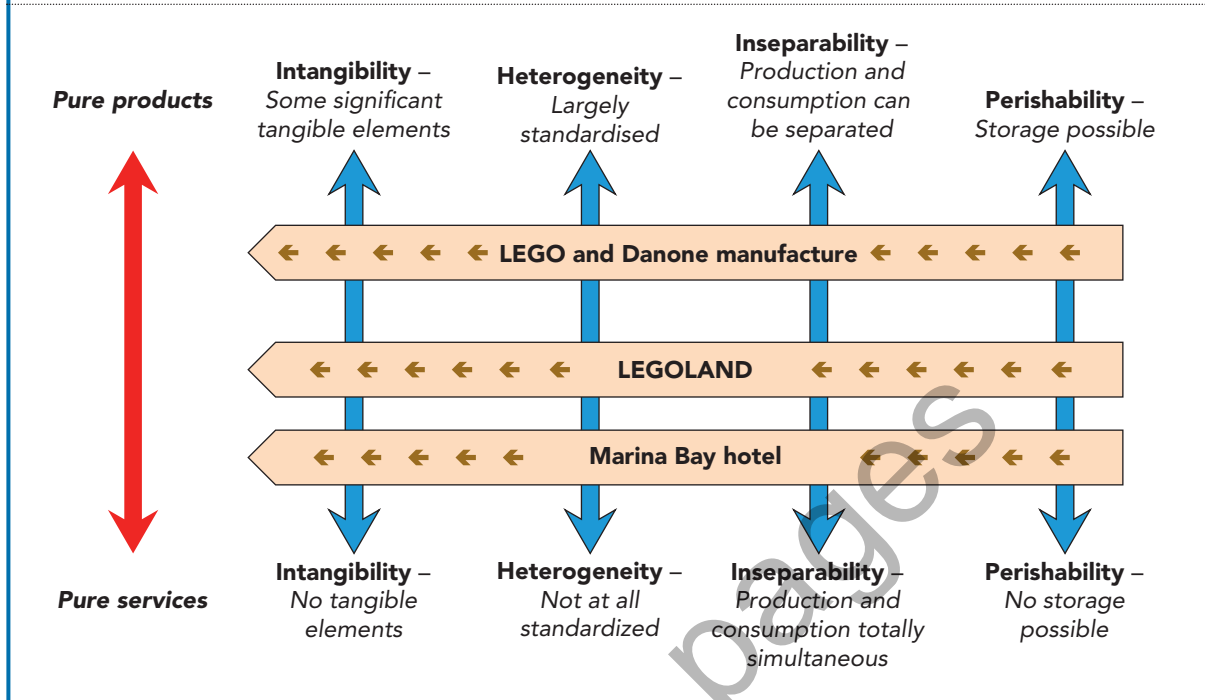
Yet, although they cannot totally define what is a 'service' and what is a 'product', most operations produce outputs somewhere on a spectrum of the IHIP characteristics. Figure 1.4 shows some of the operations described in this chapter positioned in a spectrum using the IHIP characteristics, from almost 'pure' goods producers to almost 'pure' service producers. Both LEGO and Danone are classic manufacturers, making standard products. At the other extreme, LEGOLAND and the Marina Bay Sands hotel are producing intangible services.

Increasingly the distinction between services and products is seen as not particularly useful. Some authorities see the essential purpose of all businesses, and therefore all operations, as being to 'serve customers'. Therefore, they argue, all operations are service providers who may (or may not) produce physical products as a means of serving their customers. This idea, that all operations should be seen as offering 'value propositions' through service, is called 'service-dominant logic'.⁵ Among other things, it holds that service is the fundamental basis of exchange, that physical goods are simply the distribution mechanisms for the provision of service, and that the customer is always the co-creator of value.

Operations principle

Most operations produce a blend of tangible products and intangible services.

FIGURE 1.4 Relatively few operations produce either purely products or purely services. The output from most types of operations blend the characteristics of 'pure' goods and 'pure' services



Customers are part of the process – co-creation and co-production

The role of customers in an operation's output plays a part in how they derive value from an operation's outputs. Patients visiting the doctor with an ailment are required to describe their symptoms and discuss alternative treatments – the better they can do this, the better the value they derive. The concept is usually known either as **co-creation** or **co-production**. Often co-creation implies customer involvement in the design of a product or service, while co-production implies customer involvement just in the production of a pre-designed offering. The important point is the role of customer collaboration within an operation.

Servitisation

A term that is often used to indicate how operations, which once considered themselves exclusively producers of products, are becoming more service-conscious is '**servitisation**' (or servitization). Servitisation involves (often manufacturing) firms developing the capabilities they need to provide services and solutions that supplement their traditional offerings. The best-known example of how servitisation works was when Rolls-Royce, the aero engine manufacturer, rather than selling individual engines, offered the option of customers being able to buy 'power-by-the-hour'.⁶ What this meant was that

Operations principle

Servitisation involves firms developing the capabilities to provide services and solutions that supplement their traditional product offerings.

many of its customers in effect bought the power the aero engine delivers, with Rolls-Royce providing both the physical engines and all the support (including **maintenance**, training, updates, and so on) to ensure that they could continue to deliver power.

Customers

Customers may be an input to many operations, but they are also the reason for their existence. Without customers there would be no operation. So, it is critical that operations managers are aware of customers' current and potential needs. It is also why most operations put considerable effort into assessing how customers view their offerings and bringing what is sometimes known as the '**voice of the customer**' into their operation.

Operations principle

An understanding of customer needs is always important, whether customers are individuals or businesses.

1.3 Why is operations management important to an organisation's performance?

It is no exaggeration to view operations management as being able to either 'make or break' any business. The operations function is large and, in most businesses, represents the bulk of its assets and the majority of its people. But, more than this, the operations function gives any organisation the ability to compete by providing the ability to respond to customers and by developing the capabilities that will keep it ahead of its competitors in the future. But when things go wrong in operations, whether it is the recall of a faulty product, a customer being injured on a theme park ride, or the failure to protect against a cyberattack, the financial and reputational damage can last for years.

Performance at three levels

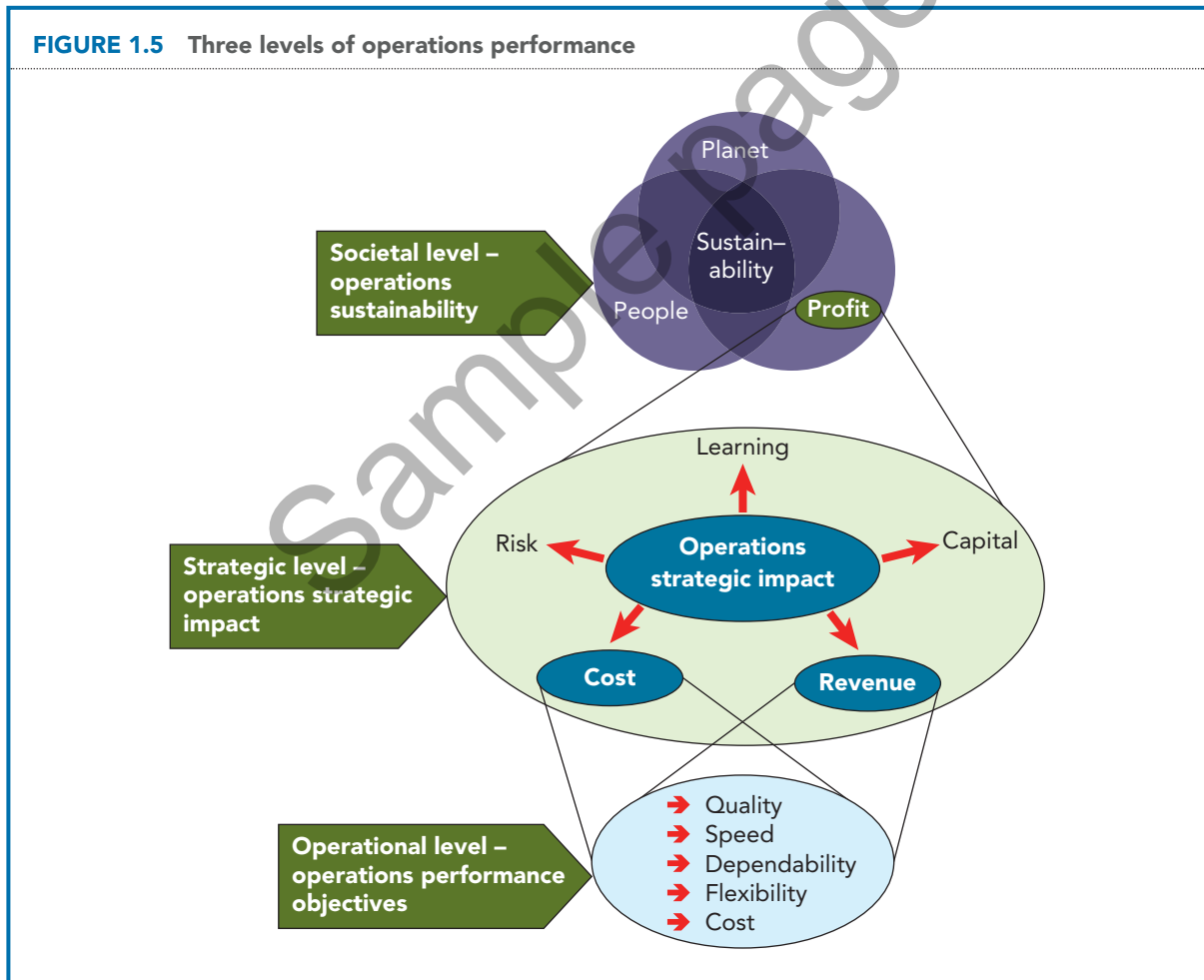
The idea of operations 'performance' is not a straightforward or simple concept. Several measures are always needed to convey a realistic overview of the various aspects of performance. Also, performance can be assessed at different levels. Here we will look at how operations can judge their performance at three levels:

- ★ The broad, societal level, using the idea of the 'triple bottom line'.
- ★ The strategic level of how an operation can contribute to the organisation's overall strategy.
- ★ The operational level, using the five operations 'performance objectives'.

These three levels of operations performance are illustrated in Figure 1.5.

Operations performance at a societal level

No operation exists, or performs, in isolation. Its decisions affect a whole variety of **'stakeholders'**. (Stakeholders are the people and groups who have a legitimate interest in the operation's activities.) Some stakeholders are internal, for example the operation's employees; others are external,



for example customers, society or community groups, and a company's shareholders. And although different stakeholders will be interested in different aspects of operations performance, if one is to judge operations at a broad societal level, one must judge the impact it has on all its stakeholders.

Corporate social responsibility (CSR) and the triple bottom line (TBL)

This idea that operations should consider their impact on a broad mix of stakeholders is often termed '**corporate social responsibility**' (CSR). According to the UK Government's definition; 'CSR is essentially about how business takes account of its economic, social and environmental impacts in the way it operates – maximizing the benefits and minimizing the downsides'. A common term that tries to capture this idea is the '**triple bottom line**' (TBL),⁷ also known as 'people, plant and profit'. The idea is simply that organisations should measure themselves not just on the traditional economic profit that they generate for their owners, but also on the impact their operations have on society and their ecological impact on the environment.

The **social bottom line** (people) – is measured by the impact of the operation on the quality of people's lives, for example by assessing factors such as customer safety from products and services, employment impact of an operation's location, implications of **outsourcing**, staff safety and workplace stress, non-exploitation of suppliers in the Global South, etc.

The **environmental bottom line** (planet) – is measured by the environmental impact of the operation, for example by assessing factors such as recyclability of materials, energy consumption, waste material generation, transport-related energy, pollution, and the environmental impact of process failures.

The **economic bottom line** (profit) – is measured by profitability, return on assets, and other conventional financial measures of the operation.

The combination of these three factors indicates a business's '**sustainability**'. A sustainable business is one that creates an acceptable profit for its owners, but minimises the damage to the environment and enhances the existence of the people with whom it has contact. In other words, it balances economic, environmental and societal interests. The assumption underlying the triple bottom line (which is not universally accepted) is that a sustainable business is more likely to remain successful in the long term than one that focuses on economic goals alone.

Operations principle

All operations decisions should reflect the interests of stakeholder groups.

Operations principle

Operations should judge themselves on the triple bottom line principle of 'people, plant and profit'.

Operations performance at a strategic level

Many (although not all) of the activities of operations managers are operational – they deal with relatively immediate, detailed and local issues. However, operations decisions can also have a significant strategic impact (see the next chapter). So it makes sense to ask how it impacts on the organisation's strategic 'economic' position. These are:

Cost

Almost all the activities that operations managers regularly perform (and all the topics that are described in this text) have an effect on cost. And for many operations managers it is *the* most important aspect of how they judge their performance. Indeed, there cannot be many, if any, organisations that are indifferent to their costs.

Revenue

Cost is not necessarily always the most important strategic objective for operations managers. Their activities also can have a huge effect on revenue. High-quality, error-free products and services, delivered fast and on time, where the operation has the flexibility to adapt to customers' needs, are likely to command a higher price and sell more than those with lower levels of quality, delivery and flexibility.

Required level of investment

How an operation manages the physical resources (such as buildings and equipment) that are necessary to produce its products and services will also have a strategic effect. If, for example, an operation increases its efficiency so that it can produce (say) 10 per cent more output, then it will not need to spend investment (sometimes called capital employed) to produce 10 per cent more output. Producing more output with the same resources (or producing the same output with fewer resources) affects the required level of investment.

Risk of operational failure

Well-designed and well-run operations should be less likely to fail. That is, they are more likely to operate at a predictable and acceptable rate without either letting customers down or incurring excess costs. And if they ever do suffer failures, well-run operations should be able to recover faster and with less disruption (this is called resilience).

Building the capabilities for future innovation

Operations managers have a unique opportunity to learn from their experience of operating their processes to understand more about those processes.

It is this learning that can build into the skills, knowledge and experience that allows the business to improve over time. But more than that, it can build into what are known as the 'capabilities' that allow the business to innovate in the future (an idea we explore in the next chapter).

Operations performance at an operational level

Societal-level performance and strategic-level performance, while clearly important, particularly in the longer term, tend to form the backdrop to operations decision-making. Running operations at an operational day-to-day level requires a more tightly defined set of objectives. These are called operations '**performance objectives**'. There are five of them and they apply to all types of operations. They are: quality, speed, dependability, flexibility and cost.

Why is quality important?

Quality means consistently producing services and products to specification. (We shall look further at how quality can be defined in Chapter 12.) All operations regard service and product quality as a particularly important objective. It is the most visible part of what an operation does, and it is something that a customer finds relatively easy to judge. Is the product or service right or is it wrong? There is something fundamental about quality. Because of this, it is clearly a major influence on customer satisfaction or dissatisfaction. Customer perception of high quality means customers are more likely to consume services or products again. Quality can also reduce costs. The fewer mistakes made within the operation, the less time will be needed to correct the mistakes.

Why is speed important?

Speed means the elapsed time between customers requesting services or products and their receiving them. The main external benefit of speedy delivery is that the faster customers can have the service or product, the more likely they are to buy it, or the more they will pay for it. Speed can also reduce costs. The faster material, information or customers flow through an operation, the less it costs to store, care for and keep track of them. This is an important idea, which will be explored in Chapter 11 on lean operations.

Why is dependability important?

Dependability means doing things in time so customers can receive services or products exactly when they are needed, or at least when they were promised. Customers can only judge the dependability of an operation after the service or product has been delivered, yet over time, dependability can override all other criteria. No matter how cheap or fast a delivery service is, if it is always late (or unpredictably early), then potential customers will never be

Operations principle

All operations should be expected to contribute to their business at a strategic level by controlling costs, increasing revenue, making investment more effective, reducing risks and growing long-term capabilities.

Operations principle

Quality can give the potential for better services and products, and save costs.

Operations principle

Speed can give the potential for faster delivery of services and products, and save costs.

Operations principle

Dependability can give the potential for more reliable delivery of services and products, and save costs.

able to rely on it. It is the same inside an operation. A lack of dependability results in an ineffective use of time, which translates into extra cost.

Why is flexibility important?

Flexibility means being able to change the operation in some way. This may mean changing so that the operation can produce new or modified services or products, being able to produce a wide range of services or products, being able to change its level of output or activity to produce different quantities of services or products, or the ability to change the timing of the delivery of its services or products. And all of these types of flexibility can give value to customers. But, once again, there are internal advantages to having operational flexibility. Flexible operations can switch between activities without wasting time and money, and they can keep on schedule when unexpected events disrupt the operation's plans, which, in turn, can also save costs.

Operations principle



Flexibility can give the potential to create new, wider variety, differing volumes and differing delivery dates of services and products, and save costs.

Why is cost important?

To the companies that compete directly on price, cost will clearly be their major operations objective. The lower the cost of producing their goods and services, the lower can be the price to their customers. Even those companies which do not compete on price will be interested in keeping costs low. Every euro, pound or dollar removed from an operation's cost base is a further euro, pound or dollar added to its profits. Not surprisingly, low cost is a universally attractive objective. However, the ways in which operations management can influence cost will depend largely on where the operation costs are incurred. Some operations (like advertising agencies) will spend most of their money on staff, some (like semiconductor chip makers) spend vast amounts on facilities, technology and equipment, while others (like supermarkets) spend large amounts on the 'bought-in' goods that they sell on to their customers.

Operations principle

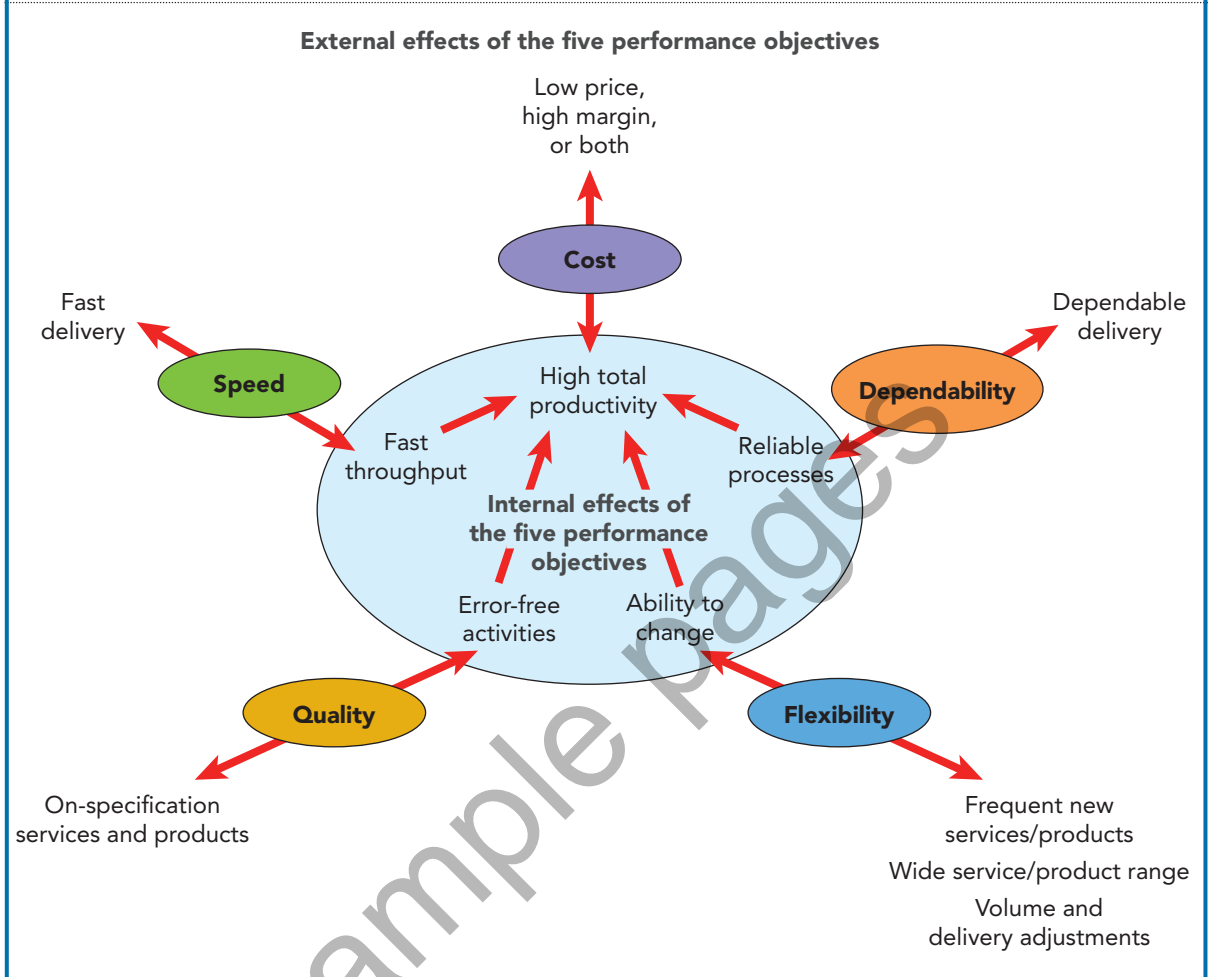


Cost is always an important objective for operations management, even if the organisation does not compete directly on price.

Quality, speed, dependability and flexibility can all save costs

Looking back at the benefits of quality, speed, dependability and flexibility, it is important to note how cost reduction can be achieved through internal effectiveness. Each of the performance objectives has the internal potential to reduce cost. High-quality operations do not waste time or effort having to re-do things. Fast operations reduce the level of internal inventory, as well as reducing administrative overheads. Dependable operations can be relied on to deliver exactly as planned, which eliminates wasteful disruption. Finally, flexible operations adapt to changing circumstances quickly and without disrupting the rest of the operation and can change over between tasks without wasting time and capacity. So, one important way to improve cost performance is to improve the performance of the other operations objectives (see Figure 1.6).

FIGURE 1.6 Performance objectives have both external and internal effects. Internally, cost is influenced by the other performance objectives



1.4 What is the process hierarchy?

So far, we have discussed operations management and the input–transformation–output model, at the level of ‘the operation’. For example, we have described the toy manufacturer, the theme park and the hotel. But look inside any of these operations. One will see that all operations consist of a collection of **processes** (although these