CHAPTER 1

The operations function

The purpose of this first chapter is to introduce the reader to the area of study called ‘operations management’. As such it sets the scene for many of the subsequent chapters in the book. The specific objectives are outlined below.

Learning objectives

1. Defining operations management. Some functional descriptions are readily understood to convey a sense of what their subject matter actually is. Finance and personnel fall into this category. The words ‘operations management’, however, do not appear to carry the same immediacy. One of the first aims of the chapter is to provide its readers with an understanding of what the term means, so that they can accurately describe the function in their own words.

2. The importance of operations management. Once understood, operations management can be seen as a vital part of any organization. It is this understanding which the chapter intends to convey. Without an operation, an organization remains an abstract wish. Operations management is, therefore, a widespread activity embracing all sectors of the economy.

3. Setting a context for the subject. Much of the book necessarily breaks down operations management into discrete topics. At the outset it is intended to set the subject into an overall context, so that its history, current concerns and economic role can be readily absorbed. One aspect of this aim is to also consider integrative ways of looking at operations, which are not specifically drawn out by the individual topics.

4. Focussing upon the environment. In the past operations managers have been accused of being too insular. ‘You can have any Model T car as long as it’s black’ and ‘pile it high
and sell it cheap’ echo this view. One of the aims of the chapter is to bring home to the reader that this internal focus upon the operation is not viable. Modern operations management requires a strong grasp of the nature of the environment within which it functions.

Operations is a practical subject. At the end of the chapter it should be clear that operations is about real people working in the real world. Although the subject does involve concepts, techniques and principles of its own, ultimately operations management is about making things happen.

Definition of operations management

Operations management is concerned with managing the resources that directly produce the organization’s service or product. The resources will usually consist of people, materials, technology and information but may go wider than this. These resources are brought together by a series of processes so that they are utilized to deliver the primary service or product of the organization. Thus, operations is concerned with managing inputs (resources) through transformation processes to deliver outputs (service or products). This idea is explored further in Chapter 2. As an area of study operations management is essentially a practical subject.

Case study

Education is an operation

In an educational setting the students are a primary input. The transformation process is the learning that takes place. The main output is the educated student. For this operation to take place there has to be timetabling, lecture facilities and management of the whole activity.

Expressed in this way it can be seen that the term ‘operations’ covers a wide range of organizations. Manufacturing, commercial service, public service and other not-for-profit sectors are all included within its scope. One way of defining the operations function of the organization is to define what the end service or product actually is. Once this is clear, the people who directly contribute to the delivery of the end service or product, and the people who closely support them in this task, can be said to be the operational personnel of the organization.
Unfortunately, people who actually perform operational roles under this definition are not always called ‘operations managers’. This makes identifying the operation more difficult than, say, identifying the financial, marketing or personnel functions. Job titles such as Hospital Manager, Technical Director and Store Manager do not have the word ‘operations’ in them, yet they are all operations management roles. Identifying the operations function is an important task however. In many organizations it is the operations function that accounts for the bulk of the staff, most of the facilities and the major costs.

The people who receive the end service or product are usually referred to as customers, although this does not mean that there is necessarily a commercial relationship involved. Citizens reporting a burglary, patients receiving National Health Service treatment and students in state-funded education are all covered by the term ‘customer’. Moreover, customers need not be external to the organization.

The idea of internal customers has gained strong currency in recent years. Thus, the medical staff of a hospital can be seen as the customers
of the patients’ records section. ‘Customer’, therefore, has a wide meaning within operations management. When defined as an internal entity it leads to the view of organizations as a network of interlocking operations. Department A, for instance, can be visualized as a transformation process providing inputs to Department B. Department B is the customer in this relationship. Department B transforms these into its own outputs, which in turn become the inputs of Department C, the customer. If these departments are actually labelled as ‘Finance’, or some other functional description, it does not stop them being perceived as both customers and operations. Similarly, individual people can be thought of as customers and operations. Work requests arrive as inputs. The knowledge of the individual, the phone and the computer constitute the processes. Letters, memorandums and other forms of communication are the outputs. These then become the inputs for other people within the organization, i.e., internal customers.

The term ‘stakeholder’ may also be used to identify who an operation is intended to serve. Essentially, a stakeholder is any person or organization with an interest in the performance of the operation. External stakeholders might include customers, the government and the media. Like the term ‘customers’, there is also an internal aspect to the definition. Employees, trade unions and senior managers might be described as ‘internal stakeholders’.

From the preceding comments it should be clear that operations management is seen as being important in the not-for-profit sector of the economy. The term ‘not-for-profit’ is usually taken to mean both public sector organizations (such as central and local government) and private non-profit bodies (like social clubs and charities).

The relevance of operations management to this sector is made clear when one considers the concerns of those managing in the area. Not-for-profit managers are faced by questions from their stakeholders that match those posed for the managers of commercial organizations. These questions include how to: improve service delivery, avoid the wasteful use of resources, reduce costs and increase customer satisfaction. The UK Government’s Best Value framework for the public sector is one example that makes the extent of these shared concerns clear. Under the Best Value framework, local government has a duty to deliver services to clear cost and quality standards and to use the most effective, economic and efficient means available. The four pillars of Best Value are that local
authorities should have: performance measurement frameworks, local performance plans, fundamental reviews (which include benchmarking) and regular audits and inspections. The need for continuous improvement is emphasized. These are all areas that operations management seeks to deal with.

This is not to say, however, that the commercial and not-for-profit sectors are the same. There are some important differences that should be borne in mind when seeking to apply ideas and techniques that have been developed in the commercial sector.

1 In terms of outputs the not-for-profit sector is expected to deliver an additional element, which could be called ‘public value’. Public value is a benefit to the wider society that goes beyond the immediate requirements of the receiver of the service. In the case of the police service, for example, it could be said that an output is the number of crimes solved but that the public value is the feeling in the community of living in a safe society.

2 Often the not-for-profit operation has to deliver its service to a more complex market. The number of stakeholder groups can exceed the number of customer groups served by commercial operations and the stakeholder groups can also be more political than commercial customers. In addition, some stakeholders might be paying for the service whilst other stakeholders actually use it.

3 There can be a strong political aspect in managing not-for-profit operations. The overall direction may be set by statute and there might be specific requirements to answer to legislative and public bodies.

4 Operations managers in the public sector can often find that they have less control over the resources at their disposal. For example, in order to change the service they might have to liaise with external organizations. A change in the treatment of drug abuse might require the police, the courts, local authority departments and charities to take coordinated action. Moreover, the people undertaking the actual work might be volunteers and therefore not in a traditional employment role.

The net effect of these differences is that operations managers in the not-for-profit sector have to be able to deal with the political context and to cope with what can be a greater degree of complexity. In terms of the basic model of operations, it can be seen that the key differences are authority as an input, external capabilities as important processes and public value as an output.
Exercises

Identify the stakeholders of a not-for-profit organization that you are familiar with. How do the stakeholders differ and how are they similar in terms of their expectations of the operation?

The tasks of operations managers

An important feature of operations is that they are dynamic systems. In other words, the inputs, the processes and the outputs are all liable to change over time. It is the role of the operations manager to make sure that these changes are planned and controlled so that the output conforms to what is required. This role demands that the operations manager undertakes a range of demanding tasks. Some of these tasks are outlined below.

1. The operations manager must understand what the overall objectives of the operation are. These objectives are usually the same general areas no matter what type of operation is concerned. They can be listed as:
   - quality
   - speed
   - dependability
   - flexibility
   - cost.

   Quality may be defined at this introductory point as performing the task to the required standard within the resources available. Improving quality can be key in improving performance against all of the other objectives. Speed objectives refer to the time it takes the operation to deliver what is required of it. The dependability objective covers how reliable the organization must be in keeping its promises to its customers. Flexibility concerns how quickly the operation can change to meet new demands. These new demands might be in terms of changing the amount of service or product delivered, changing the balance of the current range of services or products or changing the type of product or service delivered. Cost refers to the level of finances consumed by the operation. An important task for operations managers, therefore, is to understand what each of these generic objectives means in their own particular external environments.
2 The operations manager has to plan and control the operations function so that it can meet the objectives set for it. Even the simplest of operations usually requires a network of interdependent activities for it to function properly. Without adequate planning the result will be fairly chaotic. Imagine a hospital where admissions for operations were not planned. How would operating theatres, beds and staff be brought together in order to provide health care? To be most effective the operation should also plan strategically, showing what it intends to do over the medium and long terms as well as the short term. Planning by itself, however, is not sufficient. The dynamic state of operations and the environments within which they function make it essential for there to be feedback on progress against the plans. In this way plans can be amended accordingly and the operation altered in some way to reflect the new realities. This process of gaining feedback on performance and reacting to it is called ‘control’. Control is important not only in relation to the type of plans mentioned earlier, but also in relation to the daily performance of the operation. The operations manager needs to know what the operation is actually achieving in terms of quality, speed, cost and reliability. With this knowledge he or she can then alter the performance of the operation to remedy shortfalls. Planning and control therefore feature largely in the role of operations management.

Exercises

What might the objectives of operations mean in the following contexts:

- a car factory
- a supermarket
- a police force?

Case study

The Paddington train crash

At the centre of the railway disaster, which occurred close to London’s Paddington station, was the question of why the train driver of the local service train did not stop when the signal was red. There were two control systems to try to prevent a train proceeding through a red light. First, the train was equipped with a receiver to pick up a red or yellow light
The operations manager has to undertake responsibility for being involved in the design of both the end service/product and the delivery processes. This means taking responsibility for: the way in which the end product functions, the organization of the transformation process, the technology used and the design of the jobs involved. In services, the service encounter between staff and users is key to success. Designing people’s jobs so that they are well trained and motivated is thus vital. Without this involvement the operations manager will be placed in the position of having to deliver a service or product with a process that is not designed with the operations perspective taken into account. Being involved in design is not an easy role, as the operations perspective is usually concerned with the constraints of the operation, whilst the design perspective is focussed upon creativity. As a result, the operations input into design can easily be construed as unduly negative. Bringing the creative and the operations perspectives together in a positive manner is one of the features of organizations that manage design well.

The operation has to be improved. Knowing what today’s requirements are for quality, speed, dependability, flexibility and cost and managing to meet them is only a part of the task. Superior operations also work hard to improve their performance in these areas over time. Continuous improvement is an essential aspect of modern operations management. The reasons for this emphasis are not too hard to find. The customers of operations have changing expectations in all of the fields in which operations have to be good performers. Other operations which either compete directly or which set benchmark standards are also likely to be continuously improving. The net result of these two factors is that an operation which is not improving is probably actually opening up a negative gap between itself and its customers and between itself and other
relevant operations. This will ultimately lead to dissatisfied customers and a poor reputation for the operation. One way of summarizing the implications of this trend is to say that operations managers must be continuously planning improvements, implementing them, checking on the results of improvements and taking action to reinforce what has gone well and to address what has not worked so well.

5 Operations exist in a wider organizational context. Marketing, personnel, finance and design functions have close links to operations. If they are all to work successfully to a common goal then good communication between operations and the other functions of the organization is essential. Operations managers have to be able to explain their own plans to the other functions. In addition, the operational implications of what the other functions are trying to achieve need to be made clear. In essence, operations managers need to communicate the capabilities of the operation which they control. They must therefore be able to understand the different perspectives of these various functions and be able to communicate with them in an informed manner.

In performing all of these tasks the overriding objective is for the operation to be managed in a way that is both effective and efficient. Being effective means making the operation work so that it successfully delivers the intended service or product. Efficiency means performing for the lowest feasible cost. Focussing upon one of these objectives is clearly easier than attempting to achieve both. However, today’s operations have to strive to achieve both. This explains why the operations manager’s job is increasingly a difficult one.

Case study

Operations management job advertisements

The following are examples of operations jobs advertised nationally in the United Kingdom.

1 Head of Operations
Dealing in e-commerce, operations expand across the USA, the UK, Europe and Canada. Reporting to the Chief Executive (Europe) you will be responsible for the profitable development of order processing and distribution. You will head a team responsible for the European call centre, distribution operations, inventory procurement and inventory management.
2  **Customer Services Operations Manager**  
The organization is a leading direct computer systems company. You will have a crucial role in ensuring that all functions are focussed on how they contribute to enhancing the customers’ experience. Liaising with manufacturing, sales, technical support and financial services you will ensure that all customer concerns are driven to a satisfactory conclusion. You will champion the quality focus throughout the organization.

3  **Gas Exploration and Production Project Manager**  
Working for a leading worldwide gas chain business you will report to the Vice President, Project and Engineering Management. Responsibilities include developing and maintaining international reporting procedures and coordinating project performance appraisal and supply chain management. You will advise the Executive Committee on project performance across worldwide operations and against world-class benchmarks.

4  **Production Manager**  
A leading food industry company seeks a professional manager to run a team of twenty people. You will have responsibility for organizing shift patterns as well as day-to-day production and control.

5  **Operations Manager**  
The company provides a specialist, same day, high street delivery service. The Operations Manager is responsible for all inventory management, customer service, warehousing and transport. This is a complex and demanding function where meeting customer service targets and controlling costs are critical.

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**Exercises**  
Having read the job adverts, list what you think are the important qualities for an operations manager.

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**The roots of operations management**  
The history of social and economic development is dominated by organizations being formed to pursue various objectives. Such organizations require active management if they are to survive. The roots of operations management therefore go back many years. In the sixteenth century the Venice Arsenal used operations management principles to achieve extremely high efficiencies. It could, for instance, produce a war galley in twenty-four hours. This was the result of practices such as the
standardization of parts, flowline process design and specialization of labour. These principles were jealously guarded and their unauthorized knowledge was punishable by the death penalty. As a management discipline, operations management is usually associated with the work of Frederick Taylor in the late nineteenth century. He studied the execution and organization of work in a manufacturing environment and was instrumental in founding the scientific school of management. Since then the body of techniques and principles that make up operations management have developed greatly.

The main focus of operations management for many years was the factory organization. As a result the discipline tended to be called ‘manufacturing management’. Later other bodies such as distributors came within the boundary of the subject and its name evolved into production management. During the 1960s the service sector was included as a focus of attention and the name of the subject continued to evolve into today’s title: ‘operations management’.

The following are among the key factors currently driving the continued development of operations management.

1 Globalization of the economy
   Increasing competition from foreign companies has stimulated organizations to strive for better ways of producing efficiently and effectively. One aspect of this fierce competition has been the steady decline in the importance of domestic manufacturing to the economy.

Case study

Body Shop moves away from manufacturing

Anita Roddick’s Body Shop pioneered the commercial development of natural and ethical cosmetics. The manufacturing operation suffered from competition based in low-cost areas of the world. Moreover, these manufacturers were capable of quickly copying successful products. As a result Body Shop’s profit margins fell. The solution was to retrench from manufacturing and to concentrate on marketing and managing a contract supply chain.

The current battleground for marketplace dominance is being fought on the speed objective, described as time-based competition. This requires the quick provision of goods and services and rapid design-to-market lead times. These are major challenges for operations managers.
2 Total quality management
In the 1980s and 1990s total quality management ideas swept across all types of organizations. The approach was seen as embodying a unified way of managing operations for improved quality and productivity. Amongst other ideas, the movement emphasized the need to get all operational personnel involved in improvement activities (the idea of operations being part of a chain of linked operations) and the necessity for operations managers to have an external orientation.

3 Empowerment
In the 1990s empowerment was viewed as the key to cost-effective operations. It challenged the way that work was designed and managed, attempting to place responsibility for decision-making with the people who actually performed the work. Currently the challenge is to make the workforce of the operation a source of knowledge and ideas.

4 Technology
The information technology revolution of the late twentieth century has posed new opportunities for the way in which operations function. Operations managers have to master all aspects of technology, from its design to its implementation and operation. The technology has vast potential to improve the way that operations work. On the downside, technology can also be poorly managed and lead to major organizational problems.

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**Case study**

**Computer system causes passport chaos**

The Home Office began a project to switch from a paper-based to a computer-based passport processing system. The aim was to speed up decision-making in granting passports. It took three years to install the system at a cost to the taxpayer of £77 million. The technology led to a situation described in the media as chaotic. Among the results were:

- the volume of processed applications fell dramatically
- the backlog of asylum and refugee cases grew enormously
- the queues of personal callers to the offices stretched for hundreds of metres
- many telephone calls went unanswered
- sacks of letters were left unopened around the offices.

The company responsible for the computer system, Siemens, had its contract fee reduced by £4.5 million for the delays.
5 Improving public services
The desire to improve public services such as health, social security, justice and education is creating opportunities for the development of operations principles and practices in these fields.

6 Improving service sector productivity
As a major consumer of resources it is important to improve service sector productivity. In the private sector this will serve the dual purpose of increasing profit and making those sectors which are open to foreign competition more competitive. In the public sector it will yield a greater return for the public money which is invested.

Manufacturing and service-based organizations

From an operational point of view the distinction between manufacturing and service rests upon the nature of the output. Broadly, manufacturing delivers tangible outputs, whilst services produce intangible outputs. In both types of organization the efficient and effective use of resources is a primary concern and the principles and practices of operations management are therefore highly relevant to both. This is not to say that all of the techniques are equally applicable to all operations. Before considering the application of a particular approach, like statistical process control for example, the context of the operation and the scope of the technique must be fully understood.

It is rare to find an organization which is purely a producer of goods or purely a producer of services. Most operations are a mixture of the two. A factory will have a telephone call handling service and will also take customers and prospective customers on factory tours in order to impress them. Some factories have showrooms and shops where they display their outputs. These are all service operations, even though the company may regard itself as predominantly a manufacturer. Moreover, the very product itself often has intangible benefits for its user. The motor car is a classic example of this. Beyond the physical characteristics of the car, purchasers may also want a sense of safety and a feeling of prestige. Hotels might regard themselves as service operations, and yet they have many tangible outputs. Brochures, reservation documents, food, the bedrooms and other facilities are all tangible outputs. Thus a hotel may view itself as in the business of providing service, but it is also in the business of producing tangible items.
This mix of product and service leads to the notion that organizations may be rated on a scale from being 100 per cent tangible product to being 100 per cent intangible service. It is difficult to conceive of organizations occupying pure 100 per cent positions. It is far easier to accept that organizations may be defined as over 50 per cent of one type or the other. Figure 1.1 portrays the idea of organizations being part of a continuum ranging from pure manufacturing to pure service. The ratings, of course, are subjective.

Economic development seems to follow a pattern of initially being based upon agriculture, developing into reliance upon manufacturing and finally becoming dominated by service activity. The role of services in modern economies is certainly very important and reaffirms this general pattern.

**Case study**

**The role of manufacturing and services in the economy**

The pattern of the developed western economies has changed substantially over the last fifty years. There has been a shift away from manufacturing to services, especially to financial services and business services such as computer services, equipment hire and accountancy. Over this period other services have constantly remained as important areas of economic activity, including health, education and social services.

Today, services account for over half of the Gross Domestic Product (GDP) in the United Kingdom, France, Germany and Italy. In these same countries, manufacturing provides around 20 per cent of the GDP. In the United States of America the role of the service sector is even greater.
In terms of contributing to export earnings, in the United Kingdom at least, manufacturing is still the dominant sector. Services account for around only one quarter of the total exports of goods and services. However, service exports continue to grow whilst manufacturing exports remain on a plateau.

Productivity performance across the two sectors shows marked differences. In manufacturing the United Kingdom’s productivity lags behind that of the United States, France and Germany. The gap, however, has been steadily reducing. In the service sector, the overall productivity gap with other nations has not been closing. Thus, the increasingly important role of services as major sources of employment seems to be driven by the dual stimuli of increasing demand and stubbornly low productivity.

Classifying operations by key environmental factors

Identifying whether the operation is a service- or manufacturing-orientated organization is an important step in analysing its performance. Another important criterion is the type of environment within which the operation functions. The key environmental variables for operations managers are:

- volume
- variation
- variety
- customer contact.

The key task is to design the operation so that it matches these features of its environment as closely as possible. If the planning and control of the well-designed operation is good then the dual goals of efficiency and effectiveness are more likely to be achieved.

Volume

Volume refers to the number of times that an operation has to deliver a service or product. The usual descriptors for the volume dimension are high volume, medium volume and low volume. The distinctions between these three categories are usually drawn on a subjective basis. For example, McDonald’s may be said to be high volume in comparison to a French restaurant. An operation dealing with high volumes should be designed to process the demands placed upon it more speedily than
the operation meeting lower volumes. Higher volume operations can gain efficiency by breaking down the task into small units so the staff specialize in only a small part of the total work. The fact that the task is repeated many times makes it worthwhile to standardize ways of working, so that the same actions are followed time after time.

The combination of specialization, standardization and high volume also usually opens up the possibility of using technology to perform the task. The result is high output from an efficient process. Moreover, the higher volume allows the costs of the operation to be spread across more units of output, thereby reducing individual unit costs. In this way the higher level of demands will be met with greater efficiency, yielding lower costs per unit of service or product.

**Variation**

Variation describes the pattern of the volume demands. If there are many peaks and troughs in demand the situation is said to be one of high variation. The challenge in this case is to design an operation that can provide the correct level of capacity to meet this pattern. Carrying extra capacity in the times of low demand is inherently expensive, involving under-utilization of key resources such as staff, technology and facilities. Providing extra capacity at busy times can also be costly, possibly requiring recruitment, training and overtime costs. Managing a high variation operation is also more difficult and a drain on managerial resources. Low variation environments thus offer the potential for greater efficiency.

**Variety**

‘Variety’ is the term applied to the number of different types of service or product demanded. High variety environments require different services or products on a frequent basis, whereas low variety demands look for the same output for most of the time. An operation facing high variety has to be designed to provide the appropriate level of flexibility. This flexibility will usually be expensive compared to the costs of an operation designed to cope with low variety. In addition, coping with high variety is a more challenging managerial task than dealing with low variety. Planning and control and the other operations tasks will therefore be more difficult and involve more overhead costs.
Customer contact

The customer contact dimension is concerned with how much time the personnel of the operation have to spend with their customers. Customers are independent of the operation compared to its staff. The more that customers get involved therefore, the greater is the challenge to the planning and control of the operations manager. Where the planning and control is weaker, the ability to be successful and low-cost will be impaired. In the service sector the tension between the benefits of high control versus the flexibility required to satisfy the customer can be particularly acute.

One way of viewing service operations is to divide their activities into front office and back office. Front office activities involve high levels of customer contact, whereas back office activities require little customer contact. In car service operations, the customer reception area is the front office, whilst the workshop is the back office. At McDonald’s the front office is the counter and the seating area, and the back office is the food preparation area. Clearly, it is in the back office where the efficiency and effectiveness gains of high degrees of planning and control can best be obtained. The front office/back office split is an important factor to be borne in mind when operational activities are being designed.

Generally, the four factors covered above influence both efficiency and effectiveness by determining how complex the task of managing the operation is. The more complex the situation, the greater will be the challenge to get both efficient and effective delivery. In broad terms, the low volume, high variation, high variety and high customer contact operation is the greatest managerial challenge.

Exercises

What are the implications for the McDonald’s operation if its customers move towards low volume, high variation, high variety and high customer contact features?

Changes caused by the environment can clearly be difficult for operations managers to cope with. The temptation is to try to insulate the operation so that it can continue to run smoothly. In manufacturing, this desire manifests itself in large inventory stores. The rationale for this approach is that any interruptions in supply or sudden peaks in demand can be covered by the large stock. Large stocks, however, also mean large financial costs. In the service sector the desire to protect the operation from the environment may lead to creating long queues of customers,
so that the operation performs at one continuous level. The cost of this strategy is that of dissatisfying customers who have to wait for their service. In both manufacturing and service sectors operations may try to retain their insularity from the environment by making the management of the required changes the responsibility of some other function, such as marketing or purchasing. The overall drawback of these approaches is that the operations become very difficult to change. The modern emphasis, therefore, is upon removing such barriers to the environment so that operations become more responsive.

**Frameworks for analysing operations**

Analysing operations can be a difficult task. Many techniques have been developed to aid this process and many of these are covered in this book. What follows is a brief overview of two ‘integrative’ ways of analysing operations that have become influential in recent years.

**The value chain**

Activities may be analysed in terms of how much they cost compared to how much revenue (value) they add. Activities which add more cost than they add in revenue are not value-adding and should therefore be designed out of the operation. The essential question for operations managers, therefore, is to understand how all of their activities fit into this calculation for the organization as a whole. This requires several layers of analysis.

1. The operations managers have to know how the operation’s activities fare under this calculation.
2. The ways in which inbound logistics affect the value structure of operations have to be analysed.
3. The effects of the supporting activities of the company structure, human resource management, technology development and purchasing have to be assessed.
4. The effects of operational activities on the value calculations of the downstream functions of outbound logistics, marketing and sales and customer service have to be evaluated.

The net result of this analysis is a clearer view of which activities do not add value and how value is actually created.
The notion of value as expressed so far is clearly a commercial concept. It can be transferred to non-commercial organizations, however, to support the same type of analysis. In this context value is defined not as revenue but as some benefit delivered to the customers of the operation. The costs of all activities contributing to this benefit can be identified and compared to a subjective assessment of their contribution to the end benefit delivered. The costs must be outweighed by their perceived contribution to the benefit to make them worth incurring.

Using the notion of value in this broad sense to include both commercial and non-commercial meanings, value can clearly be made up of many aspects. Operations can provide these different aspects of value in differing ways:

1. Operations can change the state of some input. Manufacturing is a classic example of adding value in this way. Basic inputs like vehicle components, engines and car bodies can be changed to produce a car which is then valued highly enough to generate revenue. In the service sector the changes might be of a more personal nature. Consider the changes made by a surgeon or a hairdresser for example!

2. Operations can create value by transporting inputs. Public transport is a good example of this, where the passengers are the inputs moved to a new location.

3. Storage may also add value in certain situations. The whole warehousing industry is structured on the premise that people will pay to have their goods dealt with in a protected environment.

4. Inspections may be perceived as adding value. We place a value upon the medical inspections carried out by our doctors for instance.

Exercises

What does value mean in the education process?

The systems approach

Since the Second World War a body of knowledge called ‘systems’ thinking has been developed. It emphasizes that operations should be seen as systems consisting of individual elements which are linked together and which have a purpose or goal. What happens in any one element therefore has an effect upon the elements to which it is linked.
Thus, education can be seen as a system of individual elements such as students, academic staff and administrative staff. The purpose is to provide a positive educational experience. The primary link between these elements is information. Take away any one of these elements and the system will behave in a very different way!

Systems thinking has contributed at least three key ideas. First, the notion of operations as a series of inputs – processes – outputs open to environmental influences. This is explored in more detail in Chapter 2. It is the foundation of the view that what matters most is to identify the processes of the operation and then to design these in the most optimum manner. Business process re-engineering is a development of this perspective.

Second is the concept of control. The basic idea of control is that information on the performance of the operation is obtained and is compared to some agreed standard. If the performance does not meet the standard then the operation is corrected until it does. In this way operations can be proactively managed rather being left simply to run their own course.

The idea of control reoccurs throughout the book. Feedback control is the more usual method of measuring and correcting operations. Figure 1.2 shows in outline the basic feedback control model.

A measurement of the operation’s performance is made, in this case on the outputs. The information obtained is then fed back to a comparator. The comparator may be a person or a machine. At this stage the results of the measurement are compared to some predetermined standard. If the results do not match this standard then the comparator requests changes, in this case to the inputs. The changes are then made and the effects are measured so that the whole loop is repeated again. The output measurement might show, for instance, that the level of demand is not being met. In this instance the comparator might call for extra inputs in the form of more staff hours paid for at overtime rates. The results of this action would then be measured again to see if they were successful. Feed-forward control models are less frequent. The basic feed-forward system is shown in outline in Figure 1.3.
The essential elements are the same as the feedback model, except that in this case the change action is effected downstream from where the measurement is taken.

Third, systems thinking emphasizes the need for a structured approach towards decision-making. Broadly, the structures for decision-making fall into two categories: hard systems and soft systems. The hard systems methodology should be followed when there is clear agreement about the nature of the problem to be solved. For example, it could be that the operations team all agree that the level of current quality performance is unacceptable and needs to be improved. The hard systems methodology in such cases is to take the following steps:

1. Define the problem.
2. Analyse the existing situation and the relevant systems.
3. Identify the objectives and the constraints in relation to them.
4. Generate feasible options to achieve the objectives.
5. Formulate measures which will indicate how well the objectives are being achieved.
6. Develop in detail the preferred options.
7. Test the preferred options.
8. Make a choice of the best option.
9. Implement the solution.
10. Monitor the success of the solution.

In contrast, the soft systems methodology is applied when there is a contentious issue with little or no agreement about what the problem is. In a hospital, for instance, there might be intractable views about whether the real problem is a long waiting list or a budget deficit. The aim of the soft methodology is not to provide a solution. The purpose is to get the parties to agree on what the problem really is. The steps of the soft systems approach are:

1. Gather information about the situation.
2. Analyse the situation for the key contentious issues and the key tasks.
3 Identify the relevant systems and state their primary purposes.
4 Construct a conceptual model of what is needed to achieve the primary purposes.
5 Compare stage 4 to stage 2 in order to provide topics for discussion with the parties.
6 Review the process with the parties and explore the topics if they agree to do so.

The end point for the soft systems approach is to ask if the parties want to change the situation or not.

Summary

Definition of operations management

The key to understanding what the term ‘operations management’ means is the simple idea that it is concerned with the management of the processes which actually deliver the products or services of the organization. The processes are ways of working and what they work on are the inputs of the operation. As an activity, operations management is therefore very broad. It can be found in all sectors of the economy: those dedicated to profit and those not so dedicated. Not all jobs that are operations actually have the term in their descriptions. This makes identifying the role less than straightforward. The people or organizations who receive the outputs of operations are usually called ‘customers’. Customer, however, is very broadly defined to include both internal and external people. It does not mean that there has to be payment for the product or service. The term ‘stakeholder’ is sometimes used instead of customer. A stakeholder is anyone who has an interest in the operation. Stakeholders too can be internal or external.

The tasks of operations managers

The role of managing operations involves many tasks. Five specific tasks have been identified:

1 Managers have to understand what their operation has to be good at in their particular environment. What operations has to be good at is usually delivering to the right quality, at the right speed, keeping its promises, providing appropriate flexibility and incurring the lowest feasible costs.
Planning and control are major activities. Planning involves arranging for the orderly flow of resources so that the objectives can be met. Control means checking upon the performance of the operation against the standards expected of it. If performance is not satisfactory then taking the appropriate action to change the inputs, the processes or the outputs completes the control loop.

Simply accepting the output and the process as factors designed by someone else and trying to manage them as well as can be expected is not acceptable. Operations managers have to take responsibility for being involved in these design activities as well.

Managing the operation to hit today’s targets is important, but it is not sufficient. Customer expectations change and the best operations continue to get better. This means that modern operations managers have to seek continuous improvement in everything that their operation does.

Operations is an important part of any organization. Good communication between it and the other functions will help to make the organization function smoothly. Operations managers, therefore, have to be able to communicate across the functional boundaries. In this way the capabilities of the operation and the expectations placed upon it stand a better chance of being properly understood by all.

In performing these tasks the goal is to make the operation both efficient and effective. Efficiency focusses upon the costs of the operation, whilst effectiveness concerns success in meeting the other objectives.

The roots of operations management

References to operations management go back many years. As a discipline, operations management is usually taken to have started with the work of Frederick Taylor at the end of the nineteenth century. Today, some of the main forces shaping the development of the area are as follows.

1. Globalization
2. Total quality management
3. Empowerment
4. Technology
5. Improving public services
6. Improving service sector productivity.
Manufacturing and service-based organizations

The distinction between manufacturing and service is that the former produces tangible goods, whereas the latter produces intangible benefits. Most organizations in fact produce a mix of the two. In terms of the economy, the service sector has grown in importance over the last 50 years. Over half of the gross domestic product of advanced economies is accounted for by services. In terms of productivity improvement, manufacturing’s performance is better than that of services and manufacturing continues to be the major export-earning sector.

Classifying operations by key environmental factors

The way that an operation performs, and the way that it should be designed to best achieve its objectives, is greatly influenced by its environment. Four variables in particular are important. Volume refers to the number of services or products to be produced. Variation concerns the pattern of peaks and troughs in demand. Variety covers the range of tasks which an operation is asked to undertake. Customer contact reflects the amount of time staff have to allocate to dealing directly with customers. These factors influence the complexity of the managerial challenge. The greatest challenge is posed by low volume, high variation, high variety and high customer contact.

Frameworks for analysing operations

Two integrative ways of looking at operations are especially influential.

The value chain

Value is defined in the commercial environment as the amount of revenue less the amount of cost. In the not-for-profit sector value is defined as the benefit delivered to the user. The purpose of defining the value added by operational activities is to reveal those that appear to add negative or little positive value and to make people aware of where value really comes from. With this awareness operations can be designed to achieve the most feasible value.
The systems approach

Systems thinking has contributed at least three key ideas for analysing operations.

1. Operations can be conceived as a series of inputs – processes – outputs which is open to influence from the environment.
2. Operations have to be controlled, and control means gaining information on the performance of the operation and then changing the operation if it is not meeting some pre-defined standard.
3. Problems should be solved by following structured methodologies. The hard systems methodology applies where there is agreement on what the problem is. In situations of conflict the soft systems methodology is used.

Self assessment

1. Insert the missing words in this definition of operations management:
   ‘Operations is concerned with managing ______ through transformation ______ to deliver ______.’
2. Operations covers a narrow range of organizations. True or false?
3. Which of the following are operations management roles?
   (a) Hospital Manager
   (b) Technical Director
   (c) Store Manager
   (d) All of the above?
4. Customers must be external to the organization. True or false?
5. There are five overall objectives for operations. List at least three of them.
6. Planning by itself is not sufficient to manage processes. What other major element is needed?
7. Operations managers have to undertake all of the following except:
   (a) operational strategic planning
   (b) meeting today’s operational objectives
   (c) liaising with the design function
   (d) marketing the product
   (e) improving the operation.
8 Being effective means:
(a) delivering the very best product or service
(b) successfully delivering the required product or service
(c) keeping costs as low as possible.
9 Operations Management was developed in the 1950’s. True or False?
10 Operations management refers to:
(a) manufacturing
(b) service
(c) distribution
(d) all of the above.
11 Manufacturing is the dominant contributor to gross domestic product. True or false?
12 The implementation of technology generally:
(a) requires little preparation
(b) requires careful planning and control
(c) is of no importance to operations managers
(d) is important to operations managers.
13 Identify three reasons why improving service sector productivity is important.
14 Which of the following is not a tangible output?
(a) food
(b) chairs
(c) comfort
(d) documents
(e) cars.
15 Insert the missing words in the following statement:
‘Economic development seems to follow a pattern of initially being based upon __________, developing into reliance upon __________ and finally becoming dominated by ______ activity.’
16 The term ‘volume’ refers to:
(a) the peaks and troughs of demand
(b) the number of times a product or service has to be produced
(c) the number of different types of product or service offered.
17 The type of environment that presents the greater challenge to operations managers is characterized by low volume, high variation, high variety and high customer contact. True or false?
18 Operations can add value by:
   (a) changing the state of an input
   (b) transporting an input
   (c) storing items
   (e) inspections
   (f) all of the above.
19 In your own words describe the concept of control.
20 The systems approach to operations management emphasizes two methodologies for resolving problems and using opportunities. Name them both.

Further reading


