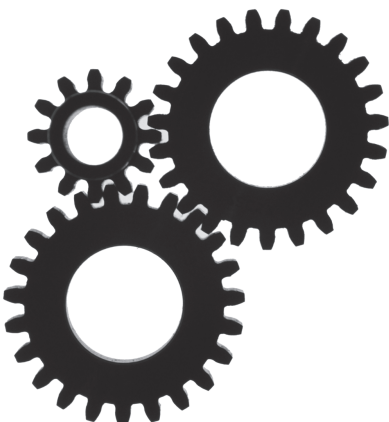


Block 2

Operations management

Contents

Block 2 introduction	3
Section A Function and strategy	
Session 7 The operations function	10
Session 8 Introducing the operations case studies	19
Session 9 The role and objectives of operations	25
Session 10 Operations strategy	33
Section B Design	
Session 11 Process design	47
Session 12 New product design	53
Session 13 Location decisions	59
Session 14 Process technology	67
Section C Planning and control	
Session 15 The nature of planning and control	73
Session 16 Capacity management strategies	81
Session 17 Inventory management	89
Session 18 Lean operations 1	95
Session 19 Lean operations 2	101
Section D The supply chain	
Session 20 The supply network	105
Session 21 Supply chain management 1	111
Session 22 Supply chain management 2	117
Section E Quality and performance	
Session 23 Quality control	121
Session 24 Total quality management (TQM)	129
Session 25 Performance improvement 1	137
Session 26 Performance improvement 2	145
Session 27 Conclusion	151
Block 2 summary	157



B203 Business functions in context is a web-based course.

This printed version of the web materials allows you to read longer pieces of text offline and provides a place for you to highlight text or make marginal notes. You will need to access the course website to take advantage of B203's full functionality and linking.

Course team

Matt Hinton, *Course Chair*
Liz McCarthy, *Course Manager*
Haider Ali, *Author*
David Barnes, *Author*
MariaLaura Di Domenico, *Author*
Sally Dibb, *Author*
Caroline Emberson, *Author*
Graham Francis, *Author*
Vira Krakhmal, *Author*
Jenny Lewis, *Author*
George Watson, *Author*
Lesley Messer, *Programme Manager*
Jenny Powell, *Course Team Assistant*
Karen Bridge, *Regional Manager*

Developmental testers

Christopher Bradley
Phil Cuff
Michael Hankinson
Chris Hull
James McGill
Adam Messer
Jamie Ruddy
Rosa Salamone

External assessor

Neil Marriott, *Head of Winchester
Business School, University of Winchester*

Critical readers

Alison Bettley
Pauline Gleadle
Jacky Hinton
Jacky Holloway
Finola Kerrigan, *Kings College London*
David Mayle
Marco Mongiello, *Imperial College*
Terry O'Sullivan
Caroline Ramsey
Howard Viney

Production team

Jes Ackland-Snow, *Interactive Media Developer*
Andy Braidley, *Service Administrator*
Anne Brown, *Media Assistant*
Jonathan Davies, *Graphic Designer*
Julie Fletcher, *Media Project Manager*
Gill Gowans, *Co-publishing Media Developer*
Paul Hoffman, *Editorial Media Developer*
Siggy Martin, *Assistant Print Buyer*
Chris Nelson, *Media Assistant*
Jane Roberts, *Producer*
Diana Russell, *Copy-editor*
Kelvin Street, *Library*
Caroline Williams, *Rights and Picture Research*

The Open University
Walton Hall, Milton Keynes
MK7 6AA

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B203 Business functions in context

Block 2 introduction

Prepared by David Barnes and Matt Hinton

Block 2	4
Block 2 introduction	4
Objectives of Block 2	4
Structure of Block 2	4
The textbook	5
Getting the most out of the block	6
Block 2 structure table	7

Block 2

Block 2 introduction

The operations function is the part of an organisation that is responsible for producing the goods and/or delivering the services required by its customers. These activities lie at the heart of any organisation, as they involve the management of the vast majority of its resources. The operations function is typically responsible for managing most of an organisation's assets, employees and expenditure. The academic discipline of operations management is the study of the activities that are undertaken within the operations function. Operations management is perhaps not as well recognised an area of study as some of the other four functional disciplines (marketing, accounting and finance, information management, and human resource management) covered in B203. Yet operations management is vitally important to the success of any organisation. No organisation can hope to be successful unless its operations are well managed. The aim of the operations function is to satisfy customers, while making the best use of resources at the organisation's disposal. This is a significant challenge.

The aim of this block is to introduce you to the most important topics within the academic discipline of operations management.

Objectives of Block 2

By the end of this block you should be able to:

- explain the role and purpose of the operations function
- understand the impact that the operations function can have on organisational strategy
- explain the most important design decisions within operations management and describe some of the techniques that can be used to inform those decisions
- understand the challenges inherent in planning and controlling operations and be able to apply appropriate planning and control approaches and techniques
- appreciate the importance of taking a supply chain perspective within operations management
- describe the most important approaches and techniques in quality management
- understand how to select appropriate measures and practices in order to improve the performance of an operation.

Structure of Block 2

In addition to this introduction the block has 21 study sessions. Each of these should involve between two and three hours of study time on average. The block is divided into five sections:

- *Section A* consists of four study sessions, which examine the function and strategic impact of operations management. The first two of these introduce you to the operations function and to the discipline of operations management. The rest of the section considers the role that it can play within an organisation's business strategy, the nature of operations strategy and how it can be formed.
- *Section B* devotes four study sessions to the issue of design within operations, which encompasses the design of both processes and

products. The key decision of where to locate operations facilities is considered. Finally, the important issue of technology is examined.

- *Section C* examines the two interrelated activities that are at the very heart of operations management, namely planning and control. Five study sessions consider the nature of planning and control, capacity management strategies, inventory management, and the techniques and philosophy of lean operations.
- *Section D* devotes three study sessions to the supply chain perspective of operations. This seeks to place any individual operation into a wider context by considering its links both with the operations that supply its inputs and with those to whom it supplies its outputs.
- *Section E's* five study sessions consider the critical areas of quality and performance to operations management. The issue of quality is examined in terms of quality control, total quality management (TQM) and quality tools and techniques. The challenges of measuring and improving performance are also considered. The last study session concludes the block. It considers five of the most important contemporary challenges facing the operations functions of most organisations.

The textbook

The textbook that accompanies this block is *Operations Management* (5th edition) by Nigel Slack, Stuart Chambers and Robert Johnson, published by FT Prentice Hall (2007). The book is referred to as Slack *et al.* throughout the block.

This book was chosen as the block textbook because it is overwhelmingly the leading operations management textbook by authors based in the UK. There are many fine US-authored operations management textbooks, but, these have two main drawbacks. First, as they are written from a US perspective and illustrated with examples set within that country's unique context, these books are often ill suited to students from other countries. In particular, the operating environment in many countries is vastly different from that in the US for many organisations, particularly those in the public sector, health and other not-for-profit industries. Second, the typical US approach to operations management places great emphasis on the tools and techniques of operations management, which are usually heavily based on quantitative methods. Such an approach is not appropriate for B203, which seeks to build a broad understanding of the key characteristics of the business functions (including operations management) rather than develop in-depth specific technical skills.

One of the reasons that Slack *et al.* is the market leader is that it is a tried and trusted text – now in its fifth edition. It covers the subject of operations management using accessible and easy to understand language. At the end of each chapter there are suggestions for further reading and a list of useful websites. While it is not essential for you to undertake the readings or visit the websites, they offer a useful source of additional information if you are keen to find out more about what you have just been reading. Towards the end of the book (pp. 698–707), there is a glossary which provides definitions of various commonly used terms in operations management. This can provide useful clarification for anything you are not sure about.

Slack *et al.* provides comprehensive coverage of the subject topics within operations management. However, this does present a challenge for its use as the operations management textbook for B203. At over 700 pages in length, there is simply too much material to ask you to read in the study time allocated to the block. Consequently, it has been necessary to make

choices in determining what you are required to read in order to complete the block.

Each study session will direct you to a number of pages from the book. Typically there will be no more than 20 pages per study session, usually all from within one chapter of Slack *et al.*. Although the structure of the block does largely follow that used in Slack *et al.*, this is not always the case. So do follow the instructions directing you to the relevant pages in the book very carefully.

Getting the most out of the block

It is important to understand that the textbook (Slack *et al.*) is completely integral to the block. Reading the book is not an optional extra. It is simply not possible to study the block successfully without studying the book. The purpose of the block material is to guide you through Slack *et al.* in the most effective and efficient manner.

It is vital that you study the readings that you are directed to. The choice of verb here is deliberate. It is important that you *study* and not merely *read* the various passages from Slack *et al.*. You need to gain an understanding of the ideas, concepts and models presented by the authors. This will require you to think about what is being written. Operations management is a very practical subject, so you should especially think about the applications and implications of what you are reading in terms of real organisations. Slack *et al.* offer a number of real-life examples within its pages. However, you will also find it helpful to draw on examples from organisations that you are familiar with yourself, perhaps as a customer or an employee, or perhaps through the experiences of friends or members of your family.

Each study session contains a number of activities which have been designed to help you test and apply your understanding of the material that you are studying. Some of the activities are taken directly from Slack *et al.*. However, most have been specially written for the particular study session. You are strongly encouraged to tackle all the activities in the block.

The operations function is vital to the success of any organisation. I very much hope that you will enjoy learning more about it. This block has been designed to take around 60 hours of study time in total.

Block 2 structure table

This table shows how the sections, sessions and Slack readings are ordered:

Block 2 structure table

Section	Session	Slack <i>et al.</i>	Slack <i>et al.</i>
Section	Session	Slack <i>et al.</i>	Section
A. Function and strategy	7	The operations function	pp. 2–33
	8	Introducing the operations case studies	
	9	The role and objectives of operations	pp. 34–60
	10	Operations strategy	pp. 61–84
B. Design	11	Process design	pp. 88–117
	12	New product design	pp. 118–46
	13	Location decisions	pp. 156–63
	14	Process technology	pp. 220–38
C. Planning and control	15	The nature of planning and control	pp. 288–319
	16	Capacity management strategies	pp. 321–46
	17	Inventory management	pp. 365–90
	18	Lean operations 1	pp. 465–78
	19	Lean operations 2	pp. 479–88
D. The supply chain	20	The supply network	pp. 147–55
	21	Supply chain management 1	pp. 400–19
	22	Supply chain management 2	pp. 420–27
E. Quality and Performance	23	Quality control	pp. 536–52
	24	Total quality management (TQM)	pp. 649–75
	25	Performance improvement 1	pp. 580–93
	26	Performance improvement 2	pp. 594–615
	27	Conclusion	pp. 678–97

You should now begin your study of this important subject by going to Session 7: The operations function.

Now go to Session 7: The operations function or take a break before continuing.

B203 Business functions in context

Session 7: The operations function

Prepared by David Barnes and Matt Hinton

Session 7	10
Introduction to Session 7	10
Activity 7.1: Operations management and the operations function	10
Activity 7.2: The transformation model	12
Activity 7.3: The four Vs of operations	14
Session 7 summary	16
Glossary	17

Session 7

Introduction to Session 7

Previous: Block 2 introduction

This session introduces you to the academic discipline of operations management. Operations management is concerned with those activities that produce the goods and/or deliver the services required by customers. The operations function is that part of an organisation where these activities take place. As such, it lies at the very core of the organisation. No organisation can hope to be successful unless its operations are well managed. The operations function can be thought of as the 'doing' part of the organisation. It is vitally important as it is responsible for the majority of organisational costs, assets and people – typically as much as 70 per cent.

All organisations have an operations function because all organisations exist to satisfy the needs of customers, either by producing goods or delivering services. There is a commonly held misconception that operations management is concerned only with manufacturing activities. However, services are increasingly important and the contribution of services to most national economies far outstrips that of manufacturing. Similarly, the overwhelming majority of employment is provided by services industries. Although there are some important differences between manufacturing and service operations, the study of operations management encompasses both sectors. There are also important differences in the way that operations are managed in different types of organisations, particularly between very large and very small organisations. Nonetheless, the academic discipline of operations management has developed concepts and models that can be applied to all organisations, whatever their differences.

This session will examine what is meant by the term operations management and introduce you to some of the models that are used to describe and classify its activities.

Your work on Block 2 will help you answer TMA 01. It might be a good idea for you to start by visiting TMA 01 questions now, so that you have them in mind as your work progresses.

The session is based on Chapter 1 of Slack *et al.* (pp. 2–33).

Activity 7.1: Operations management and the operations function

Allow **40 minutes** for this activity.

Operations management is concerned with those activities that produce goods and/or deliver services. As all organisations undertake these activities, operations management is relevant to all organisations, whether they are large or small, profit making or not-for-profit, public or private sector. That is the key message of the opening section of Chapter 1 in Slack *et al.* which you should read now.

Task A

Now go to Slack *et al.* Chapter 1, pp. 2–8. Start at the top of p. 2 and read to the end of the Oxfam short case.

Please note: for Block 2, all page and figure numbers, unless otherwise specified, refer to Slack *et al.*

Feedback

Notice how Slack *et al.* distinguish between:

- Operations management: the activities, decisions and responsibilities of managing the production and delivery of products and services.
- The operations function: the arrangement of resources that are devoted to the production and delivery of products and services.
- Operations managers: the staff of the organisation who have particular responsibility for managing some or all of the resources which comprise the operation's function.

Although operations management can encompass a wide range of activities (the IKEA case study illustrates this point to good effect), operations managers in all organisations face similar decisions. However, the context in which these decisions are taken can be very different, as the cases of Acme Whistles (a small company) and Oxfam (a not-for-profit organisation) illustrate. Furthermore, the roles and responsibilities of the operations function can be viewed very differently in different organisations.

Slack *et al.* describe operations as one of the three core functions of any organisation, distinguishing these from other 'support' functions. They adopt what they term a 'broad' definition of operations. This means that they see 'the core operations function as comprising all the activities necessary for the fulfilment of customer requests. This includes sourcing products and services from suppliers and transporting products and services to customers' (p. 5). Also, they consider that 'much of the product/service development, engineering/technical and information systems activities and some of the human resource, marketing and accounting and finance activities as coming within the sphere of operations management' (p. 5). This is well captured by Figure 1.1 (p. 6).

Task B

How would Slack *et al.* characterise the relationships between the operations function and the other business functions studied in B203 (marketing, accounting and finance, information management and human resource management)?

Feedback

In turn these would run as follows:

- The marketing function is responsible for communicating market requirements to operations, while the operations function is responsible for communicating the capabilities and constraints it faces to marketing.
- The operations function is responsible for the provision of relevant data to the accounting and finance function, which must provide operations with the financial analysis needed for performance measurement and decision taking.
- The operations function is responsible for communicating its information systems needs to the information management function, which is

responsible for providing the information systems necessary for designing, planning and controlling and improving operations.

- The operations function is responsible for communicating its human resource needs to the human resource management function, while the HRM function is responsible for the recruitment, development and training of staff required by operations.
-

Activity 7.2: The transformation model

Allow **50 minutes** for this activity.

The academic discipline of operations management is underpinned by the idea that in essence all operations are the same in that they convert inputs into outputs. That is, all operations are processes that take a set of input resources and transform them into outputs of products and services. This is termed the transformation model.

Task A

Now go to Slack *et al.* Chapter 1, pp. 8–16. Start on p. 8 with the section 'Inputs and outputs' and finish on p. 16 with Figure 1.5.

The transformation model is depicted in Figure 1.2.

Feedback

Note that inputs to the transformation process can be classified as either:

- **Transformed resources**, which are resources that are themselves transformed to become part of the output of the operation. Transformed resources are either materials and/or information and/or customers.

Or:

- **Transforming resources**, which are necessary to carry out the transformation but do not themselves form part of the output. Transforming resources are usually classified as facilities (the buildings, equipment and plant of an operation) and staff (the people who operate, maintain and manage the operation).

Also note that outputs from the transformation process can be classified as either goods or services. However, it is difficult to find an example of either a pure good (which is exclusively tangible) or a pure service (exclusively intangible). Most outputs are usually a mixture of goods and services. Figure 1.3 offers examples of outputs that comprise varying proportions of goods and services.

Task B

Apply the transformation model to each of the following examples, describing the transformation being undertaken and identifying the inputs and outputs:

- a passenger ferry company
 - a paper manufacturer
 - a radio station.
-

Feedback

My answer to this is set out in Table 7.1 below. I hope your answer will look similar, but you might have more or less detail. The exact level of detail is not that important. What is important is that you understand the nature of the transformation model, as it is vital to understanding how the subject of operations management thinks about organisational activities.

Table 7.1: The transformation model applied to a passenger ferry company, a paper manufacturer and a radio station

Organisation	Inputs	Transformation	Outputs
Passenger ferry	<i>Transformed resource:</i> Passengers (at one port) <i>Transforming resource:</i> Ship, Crew	- Changing the location of passengers - Customer processing <i>A service operation</i>	Passengers (at another port)
Paper manufacturer	<i>Transformed resource:</i> Wood pulp, recycled paper, chemicals, etc. <i>Transforming resource:</i> Paper-making machinery, Staff	- Changing the physical and chemical composition of materials - Materials processing <i>A manufacturing operation</i>	Paper
Radio station	<i>Transformed resource:</i> (Music, news, weather, traffic information, etc.) <i>Transforming resource:</i> Radio transmission equipment, Staff	- Changing the form and location of information - Information processing <i>A service operation</i>	Radio programmes (consisting of music, news, weather, traffic information, etc.)

As Slack *et al.* point out (pp. 12–14), the transformation model can be applied at three levels to analyse operations:

- *the supply network*, an arrangement of interconnected operations
- *the operation*, an arrangement of interconnected processes
- *the process*, an arrangement of interconnected resources.

They use the example of a business producing TV and video programmes to illustrate this hierarchy of operations. Perhaps you can think of some other examples for which the transformation model can be applied in a similar way to better understand an organisation's operations.

As noted on pp. 14–16, the transformation model provides the basis for the process view of organisations, in which any organisational activity can be seen as a transformation process. This approach can be applied to any part of the organisation, whether within the operations function or not. Applying the transformation model at the level of the organisation as a whole, or at the supply network level, helps reveal the 'end-to-end'

business processes. These are the processes that totally fulfil a defined external customer need. Analysing organisations as a series of end-to-end business processes provides the basis for the **business process re-engineering** (BPR) approach to performance improvement, which proved so popular and controversial in the 1990s.

Activity 7.3: The four Vs of operations

Allow **45 minutes** for this activity.

Up to this point in Slack *et al.*'s Chapter 1, the emphasis has been on stressing the similarities between operations. The next section, however, offers a model to help understand the differences between operations.

Task A

Now go to Slack *et al.* Chapter 1, pp. 16–21. Start from 'Operations processes have different characteristics' and read to the bottom of p. 21.

The four Vs model differentiates between different types of operation by using the following four dimensions:

- *Volume* – how many products or services are made by the operation?
- *Variety* – how many different types of products or services are made by the operation?
- *Variation* – how much does the level of demand change over time?
- *Visibility* – how much of the operation's internal working is 'exposed' to its customers?

Analysing an organisation's operations using the four Vs enables a profile to be drawn from which it possible to better understand the implications for the management of the operations function. You should particularly note the profiles created by the application of the four Vs to the Formule 1 and the Mwangusi Safari Lodge in the 'Two very different hotels' short case (see p. 20, figure 1.7).

Task B

You should now tackle Study Activity 3 on p. 32 of Slack *et al.* This asks you to apply the four Vs model to three different eating places (restaurants, cafes or somewhere else that food is served), and to assess how each of the four Vs impacts on its operations management. If you are not currently able to visit three different eating places, try to think about some that you have seen in the past.

Now go to Slack *et al.* Chapter 1, pp. 32.

Feedback

You should, I hope, have no difficulty in identifying some suitable establishments to analyse. The issues you should look for in terms of the four Vs are as follows:

- *Volume*. It is important to distinguish between the actual volume (the number of customers served) that the restaurant has to cope with, and the maximum it could cope with. The latter is called the capacity of the operation. Capacity is easier to measure because it can be calculated by multiplying the number of seats in the restaurant by the average number of customers per hour (calculated by timing the customers) and by the number of hours the restaurant is open. In other words, if there is a queue of people outside the restaurant, what is the maximum number of customers that the establishment could serve? Contrast this capacity figure with the actual number of customers in a day that the restaurant serves. You could ask the restaurant manager for this information, or make an approximation from your own observations at different times of day.
 - *Variety*. There are two important aspects to measuring variety for restaurants. The first is the range of different foods that the restaurant serves. Just count the number of different items on the menu to get an indication of this. The second is whether the restaurant will 'customise' food to your own preference. For example, does it serve steak well-done, medium and rare? Does it allow you to choose the fillings for your sandwiches?
 - *Variation*. Possibly the easiest way to measure variation is the ratio of peak demand in a day or a week, to the lowest demand during that day or week. Again, you could try asking the restaurant manager for this information, or (if you have time) make observations throughout the day or even the week. For example, the restaurant might be up to its full capacity for part of the day but, at its lowest point, only 10 per cent full.
 - *Visibility*. This is a relatively simple issue. Simply ask, 'How much of the preparation of the food do you witness?' It is unusual to see every aspect of food preparation – preparing the vegetables, slicing the bread, etc. But you may see food being cooked and assembled in some burger restaurants. The other way of looking at this issue is to ask yourself whether the preparation of the food is being deliberately put 'centre stage' in the restaurant. Some restaurants have a policy of doing this so as to entertain customers while they are waiting for their food (source: Pearson, 2008).
-

The rest of the chapter is devoted to two themes:

- 1 The activities of operations management: these are discussed on p. 21 and then presented as the model of operations management (Figure 1.8, p. 25) that is used to provide the structure for the book.
- 2 The importance of operations management: this is asserted by pointing to its impact on costs, revenue, investment and innovation in any organisation. The role of the operations function in responding to important pressures from the modern business environment is also highlighted. Finally, the impact of different operations management approaches and actions on organisational performance is illustrated, using some detailed financial calculations.

Session 7 summary

This session has introduced you to the academic discipline of operations management and examined some of the models that are used to describe and classify its activities. It has been noted that all organisations have an operations function because all organisations exist to satisfy the needs of customers, either by producing goods or delivering services. Furthermore, services are increasingly important and operations management is not just concerned with manufacturing activities.

Now go to Session 8: Introducing the operations case studies or take a break before continuing.

Glossary

business process re-engineering

The philosophy that recommends the redesign of processes to fulfil defined external customer needs (Slack *et al.*, 2007, p. 698)

transformed resources

The resources that are treated, transformed or converted in a process, usually a mixture of materials, information and customers (Slack *et al.*, 2007, p. 706)

transforming resources

The resources that act upon the transformed resources, usually classified as facilities (the buildings, equipment and plant of an operation) and staff (the people who operate, maintain and manage the operation)(Slack *et al.*, 2007, p. 706)

B203 Business functions in context

Session 8: Introducing the operations case studies

Prepared by David Barnes and Matt Hinton

Session 8	20
Introduction to Session 8	20
Activity 8.1: Watching the DVD case studies	22
Activity 8.2: Applying the Transformational Model to the Case Organisations	22
Activity 8.3: Applying the 4 Vs Model to the Case Organisations	23
Session 8 summary	23

Session 8

Introduction to Session 8

Previous: Session 7: The operations function

This short session is designed to familiarise you with the four operations management case studies that are used throughout this block and which will form an integral part of your TMA work.

The DVD, filmed in late 2007, is designed to illustrate some basic concepts covered by the course. It contains four short case studies about operations in the following organisations:

- bmibaby – a no-frills airline
- Vue – a chain of multiplex cinemas
- Elm Surgery – a general medical practice located in the southwest of England
- Fuller's – a brewery.

There are also short Introduction and Conclusion clips that you may find helpful when viewing the material for the first time, or if you want to make a quick comparison of the organisations.

At the end of each section (A to E) of this block you will be directed to view the DVD and to undertake an exercise based on it. The purpose of these notes is to help you get the most out of this material.

The case organisations

bmibaby

bmibaby was launched in March 2002 as a wholly owned no-frills subsidiary of British Midland Airways. By October 2007 it was operating a fleet of 22 aircraft (all Boeing 737s) to 28 European destinations from its 4 UK 'hub' airports; Birmingham, Cardiff, East Midlands and Manchester. As is evident from the DVD, the company concentrates on offering a basic service at a low price and takes great pains to ensure low overheads (e.g., web-based ticketing), manageable variety (all the planes are 737s) and efficient asset utilisation (high load-factors and a schedule that maximises flying time for its aircraft). One of three senior managers with operations management responsibilities featured in the DVD, commercial director Steve Burns epitomises the modern operations manager, having responsibility for sales and distribution, network planning and development, e-commerce, revenue management and customer service functions.

For additional information go to: bmibaby.com (bmibaby limited, 2008).

Vue

Vue Entertainment is another relatively young organisation, formed in 2003 with the acquisition of 36 cinemas from the Warner Village chain. In 2006, Vue was the subject of a management buy-out. Backed by the Bank of Scotland, the management team retains a 51 per cent stake in the business. By October 2007 it was operating 579 screens and 130,585 seats in a total of 59 cinemas. It sees its approach as firmly based upon its desire to consistently provide 'the best and most innovative cinema experience'. Recent innovations

include live coverage of Formula 1 motor racing, as well as live rock gigs in full high definition and surround sound. Vue has also pioneered such features as Gold Class screens (for over-18s only, with luxury seating, dedicated bar and complimentary popcorn) and Vista ticketing (where guests can purchase their tickets at any retail outlet within the cinema complex). Like bmibaby, ancillary sales (e.g., from food and drinks) form an important revenue stream.

For additional information go to the [VUE corporate website](#) (VUE, 2008).

Elm Surgery

Elm Surgery in Plymouth offers a good example of a modern UK doctors' surgery. Rather than the basic consulting rooms (often of a single doctor) that were the norm in the UK little more than a generation ago, Elm features five doctors; four practice nurses; a healthcare assistant; team of typically six receptionists; a practice manager plus assistant; an administrator and a secretary. In addition to this permanent staff, the surgery also acts as the local base for a wider network comprising district nurses, a community midwife, Macmillan Nurses and a counsellor. Such arrangements assist with both the effective handling of patients and the efficient use of scarce clinical resources, enabling the surgery to offer a vastly wider range of services, many of which would previously have necessitated a visit to a more distant hospital. It is the coordination of this range of activity which brings Elm Surgery firmly into the domain of operations management.

For additional information go to the [Elm Surgery website](#) (Yellow Creative Ltd, 2006).

Fuller's

Operating from the historic Griffin Brewery site in Chiswick, west London, Fuller's is an independent family brewer and pub company whose brands include the world-famous ESB and London Pride, the UK's best-selling premium cask ale.

Fuller's is the only one of the four DVD cases with a tangible goods-based product, but customer service is an important aspect of the total package of 'value' it must deliver. Fuller's takes great pride in a deliberately 'premium' product. Although maintaining a very traditional image, innovation is highly important to the company in both its product (to reflect the trend towards home consumption and away from drinking in licensed premises) and its processes (witness the more than halving of the water required to make each pint of beer). The emphasis on quality in what is effectively a large batch process is a good illustration of Philip Crosby's 'Quality is Free' thesis; the costs being notably less than those that would flow from 'getting it wrong'. (This will be discussed when the topic of Total Quality Management is considered in Session 25.)

For additional information go to: [Fuller, Smith & Turner P.L.C's website](#) (Fuller, Smith & Turner P.L.C, 2008).

Activity 8.1: Watching the DVD case studies

Allow **60 minutes** for this activity.

Task

Watch the Block 2 section of the DVD in its entirety to familiarise yourself with the cases. While you're watching, think about the following tasks:

- 1 What are the main transformed and transforming resources in the operations of each of the four cases?
- 2 How might you use the four Vs model to compare the operations of the four organisations? What differences might this show?

You will return to these tasks in Activities 8.2 and 8.3.

Now go to your DVD and watch all the videos in 'Block 2 Operations management'.

You can find transcripts for each of these videos in the Block 2 transcripts pages.

Activity 8.2: Applying the Transformational Model to the Case Organisations

Allow **20 minutes** for this activity.

Task

Identify the main transformed and transforming resources for the four DVD cases

Feedback

Table 8.1: Transformed and transforming resources for the four DVD cases

Case	Transformed resources	Transforming resources
bmibaby	Customers (passengers), materials (passenger baggage), information	Aircraft, staff
Vue	Customers , information	Cinema buildings & equipment, staff
Elm Surgery	Patients (customers), information	Surgery building & equipment, staff
Fuller's	Materials (raw materials, work in progress, finished products), information	Brewery buildings & equipment, lorries, staff

Activity 8.3: Applying the 4 Vs Model to the Case Organisations

Allow **20 minutes** for this activity.

Task

Identify the main transformed and transforming resources in the operations of each of the four cases

Feedback

Table 7.3: The four V's model applied to the four DVD cases

Case	Volume	Variety	Variation	Visibility
bmibaby	High	Low	Medium/High	High
Vue	High	Low	Medium/High	High
Elm Surgery	Medium/Low	Medium	Low	High
Fuller's	High	Low	High	Low

Session 8 summary

This session has introduced you to the four case studies that will be used throughout this block to help you to apply operations management theories and concepts to real scenarios.

Now go to Session 9: The role and objectives of operations or take a break before continuing

B203 Business functions in context

Session 9: The role and objectives of operations

Prepared by David Barnes and Matt Hinton

Session 9	26
Introduction to Session 9	26
Activity 9.1: The role of the operations function	26
Activity 9.2: Operations performance objectives	27
Activity 9.3: The Penang Mutiara case study	30
Session 9 summary	31

Session 9

Introduction to Session 9

Previous: Session 8: Introducing the operations case studies

All organisations exist to achieve some particular purpose. This might be purely financial, perhaps expressed in terms of achieving a certain level of profitability or sales revenue. However, there are many organisations that do not seek to make profits, for example those in the public sector or charities. Such not-for-profit organisations exist for other purposes. This might be to provide a specific service (e.g., health, education) to a particular set of customers (the population of an area, a group of students, etc.). Even profit-seeking companies often articulate their purposes in non-financial terms. For example, Japanese car manufacturer Toyota says its aim is to 'enrich society through car making' ([Toyota's corporate website](#), Toyota Motor Corporation, 2008), while Sainsbury's the UK grocery chain says its goal is to 'deliver an ever improving quality shopping experience for customers with great product at fair prices' ([Sainsbury's corporate website](#), J Sainsbury plc, 2008).

Whatever their other purposes, all organisations share the common purpose of supplying some kind of goods and/or services to their customers. As the part of the organisation that is responsible for producing those goods and/or services for customers, the operations function makes a vital contribution to achieving organisational purpose. An organisation's strategy is the means by which it tries to achieve its purpose. As such, an organisation's operations function contributes to strategy. The question for those concerned with the management of operations is: what is and what should be the contribution of the operations function to an organisation's strategy?

This session considers the contribution of the operations function to organisational strategy. It does this by addressing two questions:

- 1 What strategic role does the operations function play within an organisation?
- 2 What are the specific performance objectives of the operations function?

The session is based on Chapter 2 of Slack *et al.* (pp. 34–60).

Activity 9.1: The role of the operations function

Allow **30 minutes** for this activity.

The different roles and contributions that the operations function can make to an organisation's business strategy are discussed by Slack *et al.* in the first part of Chapter 2.

Task A

Now go to Slack *et al.* Chapter 2, pp. 34–9. Start at the top of p. 34 and read to the end of the 'Critical commentary' on p. 39.

Feedback

Slack *et al.* use two models to frame their discussion.

First, they characterise three possible roles for the operations function, namely:

- implementing business strategy

- supporting business strategy
- driving business strategy.

Moving from implementing to supporting to driving increases the importance of the operations function to an organisation's business strategy.

Second, they describe the Hayes and Wheelwright four-stage model which identifies four different roles that the operations function can play. Hayes and Wheelwright depict their model as a series of steps that any organisation should aspire to climb. This is underpinned by their belief that the operations function can be a source of competitive advantage if it is managed strategically. As Figure 2.3 (p. 38) indicates, as the operations function moves up the stages its contribution to business strategy as this increases its strategic impact. However, this requires increasing its capabilities. As the critical commentary box (p. 38) points out, not everyone agrees with Hayes and Wheelwright's assessment.

Task B

For an organisation that you know well (perhaps as an employee or a customer), assess the role and contribution of its operations function to its business strategy. Consider the following questions:

- 1 Does its operations function implement, support or drive its business strategy?
- 2 Which of Hayes and Wheelwright's four stages best describe its operations function?

It is not possible to provide feedback on this activity, as the answer you get will depend on the organisation you are considering.

Activity 9.2: Operations performance objectives

Allow **75 minutes** for this activity.

If the operations function is going to make an effective contribution to organisational strategy, it must be clear what is expected of it. Having a clear set of operations objectives can provide the criteria to inform the everyday decision making of those who work in and with the organisation's operations function. Slack *et al.* provide detailed analysis of the possible objectives that an operations function might have and discuss what these can mean for different types of operations.

Task A

Now go to Slack *et al.* Chapter 2, pp. 39–53. Start with 'Operations performance objectives' on p. 39 and read up to 'without wasting time and capacity' on p. 53.

Feedback

Slack *et al.* identify five 'basic' performance objectives that can be applied to any type of organisation, namely:

- 1 quality
- 2 speed
- 3 dependability
- 4 flexibility
- 5 cost.

They provide an assessment of what each of these five objectives mean in four different operations: a hospital, an automobile plant, a bus company and a supermarket. Study this section carefully, noting the meaning attached to each of the five performance objectives by Slack *et al.* Check your understanding of the differences between the five objectives by carrying out the next activity.

Task B

Write down a brief explanation of each of Slack *et al.*'s five performance objectives. What benefits does excelling at achieving each of these objectives provide externally and internally for the operations function?

Feedback

- 1 Quality means 'doing things right'. It signifies consistent conformance to customers' expectations. This can mean offering a product or service with a superior specification and/or producing a product or service that consistently achieves conformance to its specification.
Externally, quality enhances the product or service in the market, or at least avoids customer complaints.
Internally, quality both decreases costs and increases dependability.
- 2 Speed means 'doing things fast'. It signifies minimising the elapsed time between customers requesting products or services and receiving them.
Externally, speed can enhance the value of the product or service to customers, thereby improving customer service.
Internally, speed both reduces inventories by decreasing internal throughput time and reduces risks by delaying the commitment of resources.
- 3 Dependability means 'doing things on time'. It involves delivering, or making available, products or services at the time they were promised to the customer.
Externally, dependability enhances customer service, or at least avoids customer complaints.
Internally, dependability saves the time and money that would otherwise be taken up in solving reliability problems and also gives stability to the operation.
- 4 Flexibility means 'changing what you do'. It signifies the degree to which an operation's process can change what it does, how it is doing it, or when it is doing it.

Externally, flexibility enables the organisation to:

- introduce new products and services frequently (product/service flexibility)
- offer a wide range or mix of products and services (mix flexibility)
- deliver different quantities or volumes of products and services (volume flexibility)
- deliver products and services at different times (delivery flexibility).

Internally, flexibility can help speed up response times, save time wasted in changeovers and maintain dependability.

- 5 Cost means 'doing things cheaply'. It involves the ability to reduce the cost of the goods and services produced.

Externally, low costs allow organisations to reduce their price in order to gain higher volumes or, alternatively, increase their profitability on existing volume levels.

Internally, cost performance is helped by good performance in the other performance objectives.

The benefits offered by each of the five performance objectives are well illustrated in Figure 2.9 (p. 52). Externally, excelling at each of the five performance objectives can provide a competitive advantage from:

- superior products/services that conform to specification (quality)
- short lead times (speed)
- on-time deliveries (dependability)
- innovative products/services and/or a wide product range and/or adjusting delivery volumes and timings (flexibility)
- low prices (cost).

It's important to understand that an organisation does not need its operations to excel at all of the five operations performance objectives in order to achieve a competitive advantage. Indeed it is likely to prove difficult for any operation to be able to excel at two or more objectives. Excelling at all five may well be impossible. As the short case examples in this section of Chapter 2 illustrate, different organisations often need their operations to excel at only one or two performance objectives. Which one (s) is/are involved depends on the organisation's business strategies. Lower Hurst Farm (p. 41) needs its operations to excel on the quality objective; the emergency services (p. 43) on the speed objective; Taxi Stockholm (p. 45) on the dependability objective; BBC News (p. 48) on the flexibility and dependability objectives; Aldi (p. 50) and Hon Hai (p. 51) on the cost objective.

Figure 2.9 also depicts the relationships between five performance objectives inside the operations function. Excelling at the four performance objectives of quality, speed, dependability and flexibility helps achieve the cost objectives through the achievement of high total productivity. (Check back to pp. 50–1 for an explanation of what is meant by the term productivity.) Quality provides error-free processes; speed provides fast throughput; dependability provides reliable processes; flexibility provides the ability to change. In each case, productivity is enhanced, thereby reducing costs. The worked example on p. 53 illustrates the financial impact of these effects.

Activity 9.3: The Penang Mutiara case study

Allow **45 minutes** for this activity.

Task

Now go to the case study 'Operations objectives at the Penang Mutiara' (pp. 56–7). Read it and answer the following questions:

- 1 Where would you place the Penang Mutiara on the Hayes and Wheelwright Stage 1–4 scale?
- 2 What are the operations objectives of the Penang Mutiara?
- 3 How do these have internal benefits for hotel as well as providing benefits for its customers?

Feedback

- 1 Although there is limited information in what is a short case study, it is possible to form a view about where the hotel might be on the Hayes and Wheelwright Stage 1–4 scale. It is not likely to be at Stage 1, as its operations do not seem to be holding the hotel back. Neither is at Stage 2, as its performance standards seem to be at least equal to those of the best hotels in its class. It seems likely that it is at least at Stage 3. It has an operations strategy that seems to fit its business requirements, which enables the hotel to be up to the standard of the best in the world. (However, it is worth noting that our evidence for this is only from the hotel manager.) Being at Stage 4 would require the hotel's operations to drive its competitive strategy. This would require the hotel to be delivering the levels of performance (e.g., in customer service and innovation) that are changing the expectations of its customers. It is questionable whether this is the case.
 - 2 The operations objectives could be characterised as follows:
 - quality: appearance of fixtures and fittings; cleanliness; courtesy and expertise of staff; appearance and taste of food; complimentary 'extras' in rooms
 - speed: response to requests from guests
 - flexibility: introduction of new services; meeting a wide range of customer requests; adjusting the timing of activities (e.g., room cleaning) to meet customer requests
 - dependability: regular and predictable cleaning times; regular supply of linen, room extras, etc.; materialisation of meals and entertainment as advertised
 - cost: keeping costs as low as possible but never compromising the other objectives.
 - 3 The internal benefits of the above operations objectives costs are related to cost. As the hotel's costs are mostly fixed, lower unit costs (for example, costs per customer) rely on achieving a high occupancy rate. This can be achieved only if the hotel continues to enjoy the very highest reputation. This in turn will happen only if the hotel achieves its performance objectives in quality, speed, flexibility and dependability. Also, another aspect of flexibility, the hotel's ability to change the number of staff allocated to particular tasks (through multi-skilling and temporary part-time staff), helps achieve the objectives of quality, speed, flexibility and dependability for guests and also reduce the costs of the hotel's operations.
-

Session 9 summary

This session has considered the contribution of the operations function to organisational strategy. In particular it has explored the strategic role played by the operations function within an organisation and then examined the specific performance objectives of the operations function. The next session looks at operational strategy in greater detail.

Now go to Session 10: Operations strategy or take a break before continuing.

B203 Business functions in context

Session 10: Operations strategy

Prepared by David Barnes and Matt Hinton

Session 10	34
Introduction to Session 10	34
Activity 10.1: Operations, strategy and operations strategy	34
Activity 10.2: Four perspectives of operations strategy	36
Activity 10.3: The content of operations strategy	38
Activity 10.4: The process of operation strategy	41
Trade-offs	41
Activity 10.5: DVD activity – operations strategy	42
Session 10 summary	44
Glossary	45

Session 10

Introduction to Session 10

Previous: Session 9: The role and objectives of operations

For some people, the very term 'operations strategy' can sound like a contradiction. Strategy is generally understood to be concerned with the long-term scope, direction and purpose of the organisation as whole. On the other hand, operations are usually understood to be concerned with the day-to-day detail of activities within the operations functions. How then can the operations function have a strategy? The answer, of course, is that while some aspects of operations management do primarily concern short-term tactical issues, other aspects involve taking decisions that have a significant long-term impact on the ability of an organisation to produce the goods and services required by its customers. The totality of such decisions amount to an operations strategy. However, there are many different understandings of what is meant by a strategy, and hence of what is meant by the term operations strategy.

This session will examine what is meant by the term operations strategy and discuss its various interpretations. It will go on to identify the operations strategic decision areas and describe how an operations strategy might be formulated and implemented in practice.

The session is based on Chapter 3 of Slack *et al.* (pp. 61–84).

Activity 10.1: Operations, strategy and operations strategy

Allow **25 minutes** for this activity.

Strategy is one of the most commonly used words in business. It is, therefore, surprising to discover that there is no agreement on an exact definition. The word certainly has military origins; it is used to describe how commanders might deploy their resources (i.e., armed forces) throughout a campaign aimed at achieving a particular objective (e.g., conquering territory or thwarting an invasion). It seems to have first been used in the world of business in the 1960s, when it was applied to the idea of long-term corporate planning. Since then, however, many different interpretations of the concept and practice of strategy have emerged. Indeed, entire books have been given over to discussing the nature of strategy. (If you are interested in this, I would recommend reading Mintzberg *et al.* (1998), which identifies ten schools of thought in strategy.)

Slack *et al.* discuss the nature of strategy at the start of Chapter 3.

Task A

Now go to Slack *et al.* Chapter 3, p. 63. Read from the top of p. 63 down to 'We will treat each in turn (see Figure 3.2.)' on the same page.

Feedback

They point out that strategic decisions:

- are widespread in their effect on the organisation to which the strategy refers
 - define the position of the organisation relative to its environment
-

- move the organisation closer to its long-term goals.

They point out that 'operations' is not the same as 'operational' and that the management of the operations function involves the strategic as well as the operational. Consequently they argue that operations strategy concerns the pattern of strategic decisions and actions which set the role, objective and activities of the operation. Thus to understand an operations strategy it is necessary to consider the totality of the various decisions and actions of operations management and how these impact on the organisations competitive position.

Task B

Now go to the 'Operations in practice' case on Ryanair on p. 62.

How does Ryanair's operations strategy differ from that of a full service airline (e.g., British Airways, AerLingus, Lufthansa)? (If you are not familiar with Ryanair, you can find out more by visiting its website Ryanair.com (Ryanair Ltd, 2008).

Feedback

Ryanair is hugely successful. That success is based almost entirely on its ability to offer very low prices. Being profitable with such low prices is only possible due to its low-cost operations. Thus its operations strategy is one based on the relentless and single-minded pursuit of the low-cost objective. This involves:

- Use of less crowded airports in smaller European cities and the secondary airports of major cities. These offer lower landing charges and enable faster turnarounds, which means Ryanair can maximise the utilisation of its aircraft.
- A fleet of identical aircraft to minimise purchasing, maintenance and servicing costs.
- Internet-only ticket sales to minimise distribution costs (passengers are emailed their travel details and booking reference). Also the use of an automated variable pricing system maximises load factors, leading to lower unit costs.
- No pre-assigned seats on-board. Passengers sit where they like, which eliminates complexity and speeds boarding.
- No free on-board catering. This reduces cost and bureaucracy. (Passengers can purchase food and refreshments on-board.)
- Other aspects such as hold baggage being charged extra, and no compensation for flight delays or cancellations.

Most of these aspects of operations contrast starkly with those of the full service airlines. The main differences are manifested in the very low level of customer service provided by Ryanair. It can be very costly to provide the levels of service normally expected by the passengers of full service airlines. If the passenger comments posted on the customer feedback pages of the Ryanair website are to be believed, many Ryanair passengers are very happy with this level of service. However, as the reviews on the independent Skytrax airline review website (Skytrax, 2008) indicate, many also seem dissatisfied.

Activity 10.2: Four perspectives of operations strategy

Allow **50 minutes** for this activity.

Slack *et al.* identify four different perspectives of operations strategy:

- the top-down perspective: what the business wants operations to do
- the bottom-up perspective: what day-to-day experience suggests operations should do
- the market requirements perspective: what the market position requires operations to do
- the operations resources perspective: what operations resources can do.

They argue that none of these alone offers a full understanding of what operations strategy is. However, each one can provide an additional insight into what constitutes operations strategy and how it comes about.

Task A

Now go to Slack *et al.* Chapter 3, p. 63–75. Start from “The ‘top-down’ perspective” on p. 63 and read down to ‘questions which each strategic decision area should be addressing’ on p. 75.

Feedback

Each of the four perspectives is considered in some detail.

Most people seem to be happy enough to accept the top-down perspective of operations strategy, in which an organisation’s most senior managers tell the operations function what it should do. However, they often seem ill at ease with the bottom-up perspective, perhaps feeling uncomfortable that it might apparently be possible for important strategic decisions to be significantly influenced by more junior members of the organisation. But it is the people who work within the operations function who are most likely to more fully understand how things really work in practice. The following example illustrates how operations staff can contribute to strategy from the bottom-up.

The metrology business

A company makes sophisticated high-technology metrology systems (the equipment and systems that precision manufacturers use to measure their products). The metrology business belongs to a corporate group that specialises in high-tech businesses. Every business in the group is expected to be at the leading edge of technological development in its industry. The metrology business is no exception to this. It is expected to be innovative and to use the latest technology in its products. The operations strategy of the business therefore stresses quality, functionality, and fast time-to-market innovation.

In recent years the business’s operations function was successful at introducing a stream of new and innovative products. However, customers were often confused by the constantly changing product range, and many of them did not require all the innovations that were being built into the products. Furthermore, constant innovation also increased the product’s cost. Because of this, the business’s salespeople and engineers devised a system of modular design. This allowed only the relevant modules to be changed when an innovation was introduced. It also allowed customers to choose the type of technological innovation that they particularly wanted.

This mode of operating has been so successful that eventually the senior management of the company formally adopted it as standard practice. It has become the strategy of the company, but it was originally formulated and implemented from the bottom upwards.

(Source: Pearson, 2008)

Similarly, most people seem to be more comfortable with the market requirements perspective than the operations resources perspective. The market requirements perspective seeks to base an operations strategy on an understanding of the marketplace and an analysis of customer needs. An identification of the competitive factors important to customers can help determine the operations performance objectives on which an operations strategy can be based.

The discussion about order-winning (**order-winners**), qualifying (**qualifiers**) and less important factors (pp. 69–72) offers a reminder that not all customers are the same. Applying this approach enables the operations function to determine where to focus its efforts. It needs to continually improve its performance in order-winning factors, while merely satisfying customers in qualifying factors and not wasting resources on less important factors. Also, as the examples on pp. 70 and 71 illustrate, segmenting the market in terms of different sets of competitive factors can enable the operations function to differentiate its products and services in order to meet the needs of quite different groups of customers.

Task B

Now go to the short cases 'Giordano' (p. 67) and 'Kwik-Fit customer needs' (p. 68). Identify the competitive factors and operations performance objectives for each company. What are the order-winning and qualifying factors in each case?

Feedback

Before Giordano, buyers of low-priced clothing in SE Asia seemed doomed to receive poor customer service and risked goods of unpredictable quality. Giordano now competes on the basis of the quality of its customer service (in terms of the ability of staff to interact with and help customers) and its products (in terms of their conformance to specification). So its performance objectives are quality and cost. However, price is likely to be a qualifying factor, while quality is the order-winning factor.

Kwik-Fit's main competitive factor is also quality of service. Customer service in Kwik-Fit's industry means staff providing reassurance and acting in a professional and responsible manner in order to counter customers' anxieties. However, customers are also concerned to receive a fast and dependable service and a low price. So, as well as quality, Kwik-Fit's performance objectives also encompass speed, dependability and cost. But while fast and dependable service and low price are probably qualifiers, quality of service is the order-winner.

Further insights into the behaviour of customers and competitors are provided by the product life-cycle model. As Figure 3.7 (p. 72) illustrates, knowing the life-cycle stage of a product can inform the identification of likely order-winning and qualifying factors and so determine the operations performance objectives.

Shaping the operations strategy with a view to meeting market requirements seems an eminently sensible way to proceed. However, this presupposes that the operations function has or can obtain the necessary resources and capabilities in order to meet market requirements. The situation is further complicated by the fact that market requirements change over time. The market requirement perspective also assumes that an operation can change in ways that will continue to align it to the needs of its marketplace. The operations resource perspective emphasises the importance of understanding not only resources and capabilities but also constraints. This approach encourages organisations to check whether a proposed operations strategy based on meeting a particular market requirement is feasible. However, the operations resources perspective also opens the way to identifying business strategies based on existing operations capabilities or those that can be readily developed. This operation-led approach to strategy development is the basis of Stage 4 on the Hayes and Wheelwright model (see Session 9).

Activity 10.3: The content of operations strategy

Allow **25 minutes** for this activity.

It is conventional to distinguish between ‘the content’ and ‘the process’ of operations strategy. The content of operations strategy is the set of decisions and actions concerning the role, objective and activities of the operations function. Slack *et al.* list these in Table 3.3 (p. 76). However, their categories are based on the structure of their book. A more conventional classification is laid out in Table 10.1.

Table 10.1: Operations management strategic decision areas

Structural decision areas	<i>Facilities</i>	The location, size and focus of operational resources. Decisions about where to locate production facilities, how large each should be, what goods or services should be produced at each location, what markets each facility should serve, etc.
	<i>Capacity management</i>	The capacity of operations and their ability to respond to changes in customer demand. The use of facilities, working hours and staffing levels.
	<i>Technology</i>	The technology of the equipment used in operations processes. For example, the degree of automation used, the configuration of equipment.

Infrastructure decision areas	<i>Supply network</i>	The extent to which operations are conducted in-house or are sub-contracted. The choice of suppliers, their location, the extent of dependence on particular suppliers, and how relationships with suppliers are managed.
	<i>Planning and control</i>	The systems used for planning and controlling operations.
	<i>Quality</i>	Quality management policies and practices.
	<i>Work organisation</i>	Organisational structures, responsibilities and accountabilities in operations.
	<i>Human resources</i>	Recruitment and selection, training and development, management style.
	<i>Performance measurement</i>	Financial and non-financial performance management and its linkage to recognition and reward systems.
	<i>New product development</i>	The systems and procedures used to develop and design new products and services.

Structural decisions often involve major capital investment decisions, which, once made, will set the direction of operations for many years to come. They invariably impact on the resources and capabilities of an organisation, determining its potential future output. It may be prohibitively expensive to change such decisions once implemented, and hence these must be considered to be truly strategic decisions for the organisation. It may be much easier to change the organisation's marketing strategy (e.g., its target markets, or its promotional activities) than it is to change its operations strategy with respect to the structural decision areas.

Infrastructural decisions are also important as they involve the use of the operating hardware (machinery, plant and equipment etc.) of the structural decision areas. It is possible to change aspects of operations infrastructure more quickly and easily than is the case for operations structure. Nonetheless the difficulty of so doing should not be underestimated, and neither should the impact of making inappropriate infrastructural decisions.

Task

Now go to Study activity 4 on p. 83 and attempt it.

This asks you to assess the operations of the fast-food company McDonald's, comparing it with two other food outlets that seem to compete on a different basis. You are particularly asked to identify the company's performance objectives and consider how these affect the structural and infrastructural decision areas of operations strategy.

You should consider the following issues:

- prices

- the variety of items on the menu
 - the level of service (how much service is provided by the staff and how much does the customer have to do his or herself?)
 - the consistency of food quality from operation to operation
 - the speed of delivery of the service
 - the extent of standardisation in each restaurant's design (are the restaurants identical wherever you go, or do they vary in their design?)
 - the absolute quality of the food (this may seem like an obvious dimension but it is, in fact, very subjective and difficult to assess).
-

Feedback

McDonalds competes on the basis of low price, speed of service and the quality of its food (in that it should constantly conform to specification). This is achieved through the decisions taken in:

1 Structural areas

- Facilities. McDonald's outlets are typically small and have only a limited menu. Each location is chosen so that it can serve a defined population.
- Capacity management. McDonald's outlets are typically open for long hours, with staff working shifts. The number of staff required to be on duty at any one time is set according to anticipated demand at that time of day.
- Technology. The technology used is very simple and designed for the sole production of the menu items.
- Supply network. McDonald's has the buying power to ensure its raw materials are of consistent quality at low prices.

2 Infrastructure areas.

- Planning and control. All activities are tightly planned and controlled through strict procedures.
- Quality. There are strict quality control procedures to ensure the food is of consistent quality.
- Work organisation. Workers operate in teams to encourage flexibility and maintain motivation.
- Human resources. Staff are recruited on the basis of aptitude rather than having to have specific skills. Rigorous training and development ensure consistency of performance.
- New product development. All new products are developed with a view to how they can be produced at low cost and consistent quality.
- Performance measurement. Although pay is not high initially, staff are recognised and rewarded on the basis of their performance.

You should examine the structural and infrastructural decisions taken by the other restaurants and consider how these connect to their performance objectives.

Activity 10.4: The process of operation strategy

Allow **10 minutes** for this activity.

The process of operations strategy refers to the way in which decisions and actions about the content of operations strategy come about.

Task

Now go to Slack *et al.* Chapter 3, pp. 75–7. Start from the heading ‘The process of operations strategy’ on p. 75 and read to the end of the ‘Critical commentary’ on p. 77.

Feedback

Slack *et al.*'s discussion of this issue tends to depict the process of operations strategy as a formal set of procedures. These are typically associated with the top-down perspective. While such an approach can often be observed in many large organisations, operations strategy can also come about through the less formal mechanisms associated with the bottom-up perspective. As the critical commentary box on p. 77 observes, such formalisation can be of limited value in practice as it tends to oversimplify what in reality can be a very complex process.

Trade-offs

The concept of trade-off is deeply embedded in conventional academic thinking about operations strategy. Trade-offs are the way in which one performance objective is sacrificed to achieve excellence in another. The idea is that an organisation must decide which operations performance objectives are to take priority in its operations strategy. (Distinguishing between order-winning and qualifying factors is one way of doing this.) This leads to the concept of ‘focus’ in operations. The idea is that any given operation should be dedicated to the achievement of a single task, based on the pursuit of one or two performance objectives. Only in this way can the operation achieve superior performance. It is argued that it is unrealistic and indeed detrimental to ask an operation to excel in a number of different and potentially conflicting objectives. One practical application of the idea of focus is the concept of a ‘plant-within-a-plant’ (or a ‘shop-within-a-shop’). In this, one part of an operation is physically separated off in some way to enable it to concentrate on a single task, focusing on the production of a single product or service, or perhaps dedicated to serving a limited number of customers (maybe only one).

Not all experts accept the principle of the trade-off in operations. Some believe that it is possible to excel simultaneously in a number of operations performance objectives. Indeed, some argue that it is necessary to do so in order to achieve world-class performance. Their views derive from studies of high-performing Japanese manufacturers. We will return to this topic later in the block.

Activity 10.5: DVD activity – operations strategy

Allow **50 minutes** for this activity.

Task

Now go to the Vue and bmibaby DVD cases, rewatch the DVD clips and answer the following questions:

- 1 Compare and contrast the operations strategies of the two companies.
- 2 How does Vue use its operational excellence to drive its business strategy?

You will want to save your notes to a [New note in MyStuff for Activity 10.5](#).

Feedback

1. The operations strategy of each company can be summarised as follows (see Activities 10.1–4):

Table 10.2: Structural and Infrastructural decision areas for Vue and bmibaby

	Vue	bmibaby
<i>Structural: i.e., physical buildings, equipment and other facilities</i>	Establishment of high-quality and appropriately sized multi- screen cinemas in readily accessible areas that already provide appropriate ancillary services such as transport, parking, restaurants; in-house catering facilities to maximise income from ancillary sales.	Operation of hubs within the UK and destinations in UK and Europe; use of demand management systems to maximise the utilisation of aircraft; supply network design involving extensive outsourcing of ground services; aircraft fleet of appropriate size, commonality of equipment to drive low maintenance costs.

*Infrastructural:
i.e., systems, policies
and practices*

High capacity utilisation achieved by flexible approaches to film scheduling, local promotional marketing, and tailoring value-for-money offerings to the local market to encourage repeat visits; high-quality customer service through investment in staff training and development and use of quality planning and control; management of costs through, e.g., flexible staffing contracts and achieving the 'right' deal with film distributors, techniques.

High capacity utilisation with the design of schedules with 'firebreaks' to allow recovery from problems so as to achieve high levels of punctuality overall; cost minimisation by reducing ancillary services to passengers but offering overall a service that represents beyond the bare minimum to ensure high levels of customer satisfaction; in-flight services such as retail sales and refreshments at additional charge to passengers in order to maximise income and meet customer needs; rapid turnaround of aircraft; efficient use of multi-skilled staff in a variety of customer-facing roles.

There are some obvious similarities: high capacity utilisation; use of ancillary sales to boost income; cost management. There are also significant differences: the greater involvement of supply chain partners in operations processes in the case of bmibaby; the focus on the customer experience for Vue compared with the focus on the technical aspects of service such as punctuality for bmibaby. Scheduling is important for both, but this is a design issue for bmibaby and more of a planning and control issue for Vue as a result of the many more constraints on schedules in the airline case.

2. Vue regularly achieves high levels of customer satisfaction, as a result of a bundle of operational capabilities that include:

- state-of-the-art technical infrastructure
- a good understanding of local audience expectations and preferences
- knowledgeable staff
- flexibility in scheduling of films and their allocation to the various screens available so as to maximise utilisation and minimise disruptions to the easy flow of patrons around the building
- flexible staffing arrangements – part-time contracts, multi-skilling
- service quality management approaches that focus on the guest experience
- appropriate promotional campaigns
- strong central planning frameworks coupled with local flexibility
- maximising income from ancillary sales of food and beverages
- human resource management policies and practices that support flexibility in operations and highly motivated staff.

Some of these (for example, the excellent local knowledge and its translation into a tailored service) can be considered to be strategic

capabilities that have enabled Vue to outperform its competitors on a regular basis. Vue has used these capabilities to successfully expand its network of cinemas, including locations where there is direct competition with other cinema chains.

Session 10 summary

This session has considered what is meant by the term 'operations strategy' and discussed its various interpretations. It identified the operations strategic decision areas and described how an operations strategy might be formulated and implemented in a variety of practical situations. Session 11 considers the issue of process design.

Now go to Session 11: Process design or take a break before continuing.

Glossary

order-winners

The competitive factors that directly and significantly contribute to winning business (Slack *et al.*, 2007, p. 703)

qualifiers

The competitive factors that have a minimum level of performance (the qualifying level) below which customers are unlikely to consider an operations performance satisfactory (Slack *et al.*, 2007, p. 704)

B203 Business functions in context

Session 11: Process design

Prepared by David Barnes and Matt Hinton

Session 11	48
Introduction to Session 11	48
Activity 11.1: The relationship between the design of products and processes	48
Activity 11.2: Process design objectives	49
Activity 11.3: Generic process types	50
Activity 11.4: The product-process matrix	51
Session 11 summary	52

Session 11

Introduction to Session 11

Previous: Session 10: Operations strategy

Mention the word 'design' to most people and they will immediately think about the design of physical products such as items of clothing, furniture or cars. But products, services and the processes which produce them all have to be designed. The design of new products is of very direct concern to operations managers as they will ultimately be responsible for making them. However, the processes through which products are made also have to be designed. In the case of service operations, it is typically impossible to separate the service 'product' from the process as the process is the service. Operations management is primarily concerned with the management of processes. Thus operations managers are most concerned about the design of processes.

This session will consider the issue of process design. While the relationship between the design of products and the design of processes will be examined, the issue of new product design will be tackled in more detail in Session 12. The objectives of process design will also be considered. However, the main focus of the session will be to identify a number of generic process types, using the relationship between process volume and variety. The main process types for both manufacturing and service operations are described.

The session is based on Chapter 4 of Slack *et al.* (pp. 88–117).

Activity 11.1: The relationship between the design of products and processes

Allow **15 minutes** for this activity.

The design of products (or services) and processes are interrelated, because decisions taken during the design of a product/service have an impact on the decisions taken during the design of the process which produces those products or services, and vice versa.

Task

Now go to Slack *et al.* Chapter 4, pp. 88–91. Start at the top of p. 88 and end at the sentence ending '...objective in the design activity' (p. 91).

Feedback

Figure 4.2 illustrates the relationship between the design of products and processes, noting that:

- products and services should be designed in such a way that they can be created effectively
- processes should be designed so they can create all products and services which the operation is likely to introduce.

In manufacturing, overlapping the activities of product and process design can be beneficial. In most service operations, the overlap between service and process design is implicit in the nature of the service.

Activity 11.2: Process design objectives

Allow **30 minutes** for this activity.

The key to good process design is that the process should be designed to achieve specific objectives which should be linked to and derived from the strategic performance objectives for the operation

Task A

Now go to Slack *et al.* Chapter 4, pp. 91–3. Start with the heading 'Process design objectives' on p. 91 and read until after the short case 'Ecologically smart' (p. 93).

Feedback

The impact of strategic performance objectives on process design objectives and performance is illustrated in Table 4.1. (p. 91)

Task B

Now go to the short case 'Ecologically smart' on p. 93 and answer the questions at the end of it.

Feedback

- 1 The primary objectives for any automobile plant are cost and quality. In other words, the manufacturing processes must produce error-free cars (that are therefore more reliable in use) and must do so at the minimum possible cost. Minimising cost usually means minimising the cost of input resources (such as parts and energy) and ensuring that all the resources within the processes (labour and equipment) are utilised effectively. In addition, because this is a new plant producing a relatively new model of car, it may be that sales forecasts are relatively uncertain. This means that the plant and its processes must be able to meet demand, even when demand is greater than expected. Therefore, volume flexibility may be an important objective. In addition, the company is clearly interested in the ecological impact of its products and processes. This may well be because of a combination of ethical concerns and the positive publicity that can be generated by emphasising the car's 'green' credentials.
- 2 The most important objectives are certainly cost and quality. No matter how variable the demand, or how important the image of environmental sustainability, the car must still be produced profitably. This means maintaining sales volumes (partly a function of its quality) and keeping costs down (partly a function of its process efficiency). However, note that this does not necessarily conflict with environmental objectives. Recycling materials to be used within the car's structure may or may not be less expensive than using new materials, but at least offers the potential for cost savings. Just as important, the emphasis on not wasting energy by focusing on the efficiencies of flow within the factory both contributes to environmental objectives and saves money for the company. In fact, it is interesting to note how an emphasis on energy movement and material efficiencies make it easier to achieve both cost and environmental objectives.

- 3 By 2006 the Smart car was still not profitable for Daimler-Chrysler. Does this necessarily mean that some process objectives were neglected? It is not necessarily the case that some process objectives were neglected. As a set of processes the factory may be, in many ways, very well designed. The fact that the product proved not to be as appealing as was hoped is not necessarily a fault of the processes that make it. One could argue, however, that more emphasis on designing processes that were volume-flexible (that is, they could operate efficiently at very different levels of output) might have meant that the car could be produced profitably even at low volumes.

(Source: Pearson, 2008)

Activity 11.3: Generic process types

Allow **40 minutes** for this activity.

As discussed in Session 7, for most processes there is a relationship between the volume of input resources being transformed and the variety of the output produced; the higher the volume, the lower the variety – and vice versa. This enables a number of generic process types to be identified.

The generic manufacturing process types are:

- project
- jobbing
- batch
- mass
- continuous.

The generic service process types for services are:

- professional services
- service shops
- mass services.

Task

Now go to Slack *et al.* Chapter 4, pp. 93–100. Start with the heading 'Process types – the volume–variety effect on process design' (p. 93) and read to the bottom of p. 100.

Feedback

Although the generic process types of project, jobbing, batch, mass and continuous were originally applied to manufacturing operations, it is possible to use them to characterise service operations as well. However, it is becoming more common to use the specific service types of professional services, service shops and mass services.

These process types are illustrated in the volume-variety diagrams in Figure 4.3 (p. 94). Notice how process tasks become more repeated and divided, and consequently less diverse and complex, as process volumes become higher and variety lower. Similarly, process flows become more continuous and less intermittent. This has implications for the type of work tasks associated with each process type and the type of technology that is most suited to each process type. Work tasks in low–volume–high-variety processes are likely to be more varied and fragmented, but less automated, requiring workers to have a wide range of skills and giving them more

individual discretion in terms of planning and controlling their work. In high-volume–low-variety processes, work is likely to be limited in scope, more repetitious and more dominated and controlled by technology. This is well illustrated by the examples given with the description of each process type in the chapter.

Activity 11.4: The product-process matrix

Allow **30 minutes** for this activity.

The choice of process type has implications for the cost and flexibility of the process. This is captured in the product–process matrix.

Task A

Now go to Slack *et al.* Chapter 4, p. 101. Start at the top of p. 101 and read to the end of p. 101.

Feedback

The main point of the model is that it demonstrates there is a natural fit between volume and variety of products and services produced by an operation on the one hand, and the process type used to produce products and services on the other.

Task B

Think about the different categories of services offered by a typical retail bank. If you can, visit one of its branches and observe these in action. (If you can find the time, visit more than one bank, in order to make comparisons.) Then answer the following questions:

- 1 How many different types of process can you identify?
 - 2 Are these processes appropriate for the service they are delivering (in terms of the volume–variety relationship)?
-

Feedback

Large banking halls typically have a number of different areas, each dedicated to different services. Additionally, don't forget the other services that the bank offers outside the branch via the telephone or online.

The simplest service is likely to be the ATM or cash machine. This is automated, straightforward, simple and fast. It can handle high volumes but has low variety as it can deal with only a limited number of different transactions (withdrawing cash, checking, account balances, etc.). There will usually be a number of tellers behind counters to deal with a wider range of transactions. There may also be other tellers dedicated to more complex tasks like foreign currency transactions. There may also be staff available to deal with insurance, loans, mortgages, credit cards, trading in stocks and shares, etc. Some of these are akin to the professional service type and some are more like the mass service type. You might judge some to be in between these two extremes and so more like the service shop type.

You are asked to consider where the process type being used is appropriate for the service being delivered. Try to work out whether the

process that you observe lies on the natural diagonal of the product–process matrix and so is balancing the conflicting pressures on flexibility and cost.

In banks' smaller branches the tellers behind the counter may have to serve all customers, whatever service they want. If staff are well trained and knowledgeable about all the bank's products they can usually cope with the variety of process tasks required of them. However, they can process only a moderate level of volume. Once customers start arriving in large numbers, queues can quickly build up. This is very frustrating, especially for customers who only want to carry out a simple transaction (e.g., making a deposit) which would take the teller just a few moments.

Session 11 summary

This session has explored the relationship between the design of products and the design of processes. The main objectives of process design are described with particular attention being paid to a number of generic process types, using the relationship between process volume and variety. Session 12 looks at the nature and importance of new product design.

Now go to Session 12: New product design or take a break before continuing.

B203 Business functions in context

Session 12: New product design

Prepared by David Barnes and Matt Hinton

Session 12	54
Introduction to Session 12	54
Activity 12.1: The importance of design	54
Activity 12.2: The nature of new product design	55
Activity 12.3: The new product design process	55
Activity 12.4: Design simplification techniques	57
Activity 12.5: Design improvement techniques	58
Activity 12.6: Prototyping	58
Session 12 summary	58

Session 12

Introduction to Session 12

Previous: Session 11: Process design

There are very few organisations that can be successful without offering new (or at least updated) products and services to the marketplace from time to time. In some industries, no organisation can be expected to be in business for very long unless it frequently introduces new products and services. This is especially the case in industries linked to technology and fashion. Although operations managers do not usually take a leading role in new product design, evidence from successful organisations suggest it is important that they should have a very close involvement. If operations managers play a full role in the design of new products and services they can help ensure that the interrelationship between the design of products and processes discussed in the last session is fully exploited.

This session opens by discussing the nature and importance of new product design. It goes on to describe the various stages typically involved in the design of a new product (or service). Finally, some of the approaches and techniques that are available for use in the new product design process are highlighted. In particular, the concept of interactive design is introduced and techniques for design simplification and improvement are described.

The session is based on Chapter 5 of Slack *et al.* (pp. 118–46).

Activity 12.1: The importance of design

Allow **30 minutes** for this activity.

Designing new products and services is important. The next section of chapter 5 explains why this is, offering some interesting examples.

Task A

Now go to and read Slack *et al.* Chapter 5, p. 118–21. Start from the top of p. 118 and read till the end of the Critical commentary on p. 121.

There is no feedback to this task.

The Design Council is the UK's national strategic body for design. It is funded by the UK government to promote the use of design in Britain's businesses and public services. The next task asks you to take a look at the Design Council's website.

Task B

Spend a few minutes surfing its web pages. Notice how so many aspects of everyday life are affected by how products and services are designed. (Look especially at the 'About design pages'. On the 'Design in ...' and 'Design disciplines' pages you will find information about design in different industries. Read one or two about industries that you have an interest in. You might also read about some real companies in the 'Case studies' pages.)

Now go to the website of [UK's Design Council](#) (Design Council, 2008).

There is no feedback to this task.

Activity 12.2: The nature of new product design

Allow **10 minutes** for this activity.

In the next section of Chapter 5, Slack *et al.* argue that there is more to designing new products than just the physical product.

Task

Now go to Slack *et al.* Chapter 5, pp. 121–2. Start from ‘What is designed in a product or service?’ (p. 121) and read to ‘...to deliver the agreed concept’ (p. 122).

Feedback

There are three aspects to all products and services that have to be designed:

- 1 The *concept*: the understanding of the nature, use and value of the service or product.
 - 2 The *package*: the group of ‘component’ products and services that provide those benefits defined in the concept.
 - 3 The *process*: the way in which the component products and services will be created and delivered
-

Activity 12.3: The new product design process

Allow **75 minutes** for this activity.

The next section of the chapter considers the way in which new products and services are designed.

Task A

Now go to Slack *et al.* Chapter 5, pp. 122–8. Read from ‘The design activity is itself a process’ to the bottom of p. 128.

Feedback

Like other aspects of operations, new product design is itself a process. Figure 5.3 (p. 124) identifies the resources likely to be used in the new product design process.

The stages of this process are depicted in Figure 5.3 (p. 124) as:

- 1 concept generation
- 2 concept screening
- 3 preliminary design
- 4 evaluation and improvement
- 5 prototyping and final design.

Notice how ideas for new products and services (at the concept generation stage) can originate from outside the organisation (for example from

customers – existing or potential – or competitors) or from internal sources (especially from the research and development function).

Concept screening is typically depicted as a series of carefully considered decision-making stages in which well-defined criteria (feasibility, acceptability, vulnerability) are applied to progressively screen out inappropriate ideas (the 'design funnel'). This is supposed to ensure that only the very best ideas ever make it to the marketplace.

Task B

Now go to the operations in practice case 'Novartis fills its product pipeline' (p. 119). To what extent does the new product development process described in Novartis match the process described in Figure 5.3 (p. 124)?

Feedback

The stages in the Novartis new product development process are:

- 1 the drug discovery phase (10,000 candidates)
- 2 screening
- 3 pre-clinical testing (250 candidates)
- 4 screening
- 5 clinical trials – three phases (five candidates)
- 6 production for the market (one product).

This seems fairly comparable to the process previously identified by Slack *et al.* New product development in Novartis, like the rest of the pharmaceutical industry, is highly regulated in order to ensure that due rigor is applied. While this is necessary to protect consumers it is also very time-consuming, taking up to 15 years for new product to reach the market.

However, away from such highly controlled environments, new product development may not always follow such an apparently orderly logical process. Decision making in organisations does not always take place in such a neat fashion, as the critical commentary box on p. 128 notes. Neither is this necessarily a bad thing. The use of a structured model involving many stages is bound to be time-consuming. This might allow competitors with less rigid decision-making processes to steal a march and get new products to market much faster. Also, it is not unknown for well-intentioned organisations using very structured processes to screen out ideas that subsequently prove to be highly successful products for other companies.

Task C

Now go to the short case 'Spangler, Hoover and Dyson' (p. 123) and answer the questions.

Feedback

- 1 Spangler's mistake was clearly in failing to understand the implications of his preliminary design. The spark of creative genius was there, but not the ability to fully understand the design's implications or its

commercial potential. Had it been, we could today be talking about 'spanglering' the carpet.

- 2 Three things make a good design in the domestic appliance market:
 - aesthetics: the product must look good and reflect the brand value
 - usability: the product must be easy to use and work well
 - produceability: the product must be easy to make, or at least not so difficult that costs and quality are compromised.
- 3 It depends on how charitable you want to be to them. If we are being charitable, we could say that Dyson's design represented too much of a risk for the established manufacturers. They would be threatening their own existing products and forgoing the revenue they gained from selling their cleaner bags, for a design which had not been proved in the marketplace. A less charitable view would be that they were simply conservative, had little imagination and did not understand the need for innovation. Nor did they understand how a better product, alternatively positioned in the market to stress design and performance, could undermine their existing market position.
- 4 How did design make Dyson a success?

Dyson's design succeeded by systematically challenging the assumptions behind current product orthodoxy. Dyson's design brought together concepts that were not totally original but integrated them and used them in a new context. The ability to do that successfully (and the perseverance) is often far more valuable than pure creative originality. The process of design is essentially about systematically bringing together ideas and subjecting them to a critical process.

(Source: Pearson, 2008)

Activity 12.4: Design simplification techniques

Allow **10 minutes** for this activity.

The chapter goes on to outline the following three techniques that can be used to reduce design complexity:

- standardisation
- commonality
- modularisation.

These techniques are typically used in the preliminary design phase of the new product design process, but can also be used during the more detailed design activities associated with the later and final stages of the new product design process. These techniques are as applicable for the design of services as they are for products.

Task

Now go to Slack *et al.* Chapter 5, pp. 129–31. Start from the top of p. 129 and read to the end of the short case 'Customizing for kids' (p. 131).

You should aim to read this fairly quickly. While it is important to be aware of these techniques, it is not necessary to dwell on their detail or to try to remember them, unless you are particularly interested.

There is no feedback to this task.

Activity 12.5: Design improvement techniques

Allow **10 minutes** for this activity.

The chapter continues by describing three design improvement techniques, namely:

- quality function deployment (QFD)
- value engineering
- Taguchi methods.

Although Slack *et al.*, place their description in the evaluation stage of the new product design process, these techniques are commonly used as part of efforts to improve the detailed design of both new and existing products.

Task

Now go to Slack *et al.* Chapter 5, pp. 133–6. Start from ‘Design evaluation and improvement’ (p. 133) until ‘and the highest degree of uniformity’ (p. 136).

You should aim to read this fairly quickly. While it is important to be aware of these techniques, it is not necessary to dwell on their detail or to try to remember them, unless you are particularly interested.

There is no feedback to this task.

Activity 12.6: Prototyping

Allow **10 minutes** for this activity.

A technique that is frequently used in the final stages of design is that of prototyping. This involves the construction of some kind of mock-up to enable the new product or service to be tested in as near to real conditions as practical before committing to a launch. Advances in computing power have increased the likelihood of this being undertaken in virtual reality rather than creating a physical facsimile.

Task

Now go to Slack *et al.* Chapter 5, pp. 136–7. Read from ‘Prototyping and final design’ until ‘prior to full production’ (p. 137).

You should aim to read this fairly quickly. While it is important to be aware of these techniques, it is not necessary to dwell on their detail or to try to remember them, unless you are particularly interested.

Session 12 summary

The main aim of this session was to discuss the nature and importance of new product design. In particular it described the various stages typically involved in the design of a new product (or service). It highlighted the approaches that are available for use in the new product design process. Special attention was paid to prototyping, interactive design and design simplification and improvement techniques. Session 13 examines location decisions.

Now go to Session 13: Location decisions or take a break before continuing.

B203 Business functions in context

Session 13: Location decisions

Prepared by David Barnes

Session 13	60
Introduction to Session 13	60
Activity 13.1: The rationale of location decisions	60
Activity 13.2: Influences on location decisions	62
Activity 13.3: Locating a new factory or fast-food restaurant	63
Activity 13.4: Location techniques	63
Session 13 summary	64
Glossary	65

Session 13

Introduction to Session 13

Previous: Session 12: New product design

This session will examine location decisions. Decisions about where to locate an organisation's operations facilities are important because they typically involve large capital investments. Once made, these decisions are not easily or cheaply undone. By any measure, these are truly strategic decisions. They typically determine the organisation's resources and capabilities for many years to come.

The reason for the existing location of an organisation's operations can often be historic. However, in recent years more and more organisations have shown a willingness to relocate some or all of their operations; and not only within their own country. Advances in information and communication technologies have enabled service providers as much as manufacturers to consider locating some of their facilities abroad. It often seems as if they have almost unlimited choice about where in the world some of their operations could be based. Although such **off-shoring** is often driven by a desire to reduce production costs, there can be other motivations.

This session will consider the rationale of location decisions and examine the factors that underpin such decisions. It will also introduce some simple techniques that can be used to aid location decision making.

The session is based on material on pp. 156–63 in Chapter 6 of Slack *et al.*

Activity 13.1: The rationale of location decisions

Allow **30 minutes** for this activity.

In the first reading for this session, Slack *et al.* briefly discuss the importance of location, together with the reasons and objectives for location decisions.

Task A

Now go to Slack *et al.* Chapter 6, pp. 156–7. Read from the top of p. 156 to the bottom of p. 157.

Feedback

Notice how location can impact both on the supply side and the demand side of an operation.

Task B

Now go to the short case 'Disneyland Paris' (p. 157), read it and answer the questions.

Feedback

The major factors influencing Disney's decision to locate near Paris were:

- The weather. Although located in northern Europe, where the weather is not as good as it is in most of Spain (the other country considered), Disney's experience in Tokyo led it to believe that this would not be a major disadvantage.
- The proximity to markets. The location 30 kilometres (19 miles) east of Paris was within relatively easy travelling distance for literally millions of potential customers. France, the Benelux countries, Germany, the UK and even Scandinavia would find the Paris site more convenient than the alternative Spanish one.
- The transport infrastructure. The French government was willing to invest considerable sums in the development of motorway and rail links. Furthermore, Charles de Gaulle airport was very close by.
- The land availability. The French site was relatively underdeveloped, with considerable amounts of spare land available for development.
- Government assistance. The French government offered tax and other financial inducements.

The difficulties faced in the early days of running Disneyland Paris included:

- The hostility of the French press. This would not have helped Disney either to establish a market among French customers or to attract staff.
- The weather. Although Disneyland Tokyo visitors had tolerated the poor weather, European customers were less tolerant towards queuing in the rain. Also, a large part of the market (primarily the British customers) had become used to flying to Florida where the weather is considerably better.
- Cultural differences. Disneyland is firmly rooted in an American culture, which includes certain values around service. French staff do not share these values. This reportedly led to some problems.
- The customer base. If Disneyland staff in Tokyo or Florida approach a customer they can more or less predict what language to address him or her in. At Disneyland Paris, however, a customer could be any one of many nationalities. The question then is how should they be addressed?
- The language skills of staff. What languages should Disney require its staff to speak? Should all staff be multilingual, bilingual or trilingual? Also, how easy would it be easy to attract staff with both language and service skills?

Transferring a service operation between different cultures might require changes in the design. It is important to distinguish between the core elements of a service and the more peripheral ones. In this case the core elements are to do with entertainment and fun, the more peripheral ones are to do with issues such as queuing. In fact one of the mistakes made by Disneyland Paris in the very early days was to change some of the rides (arguably unnecessarily) while sticking with some of its US-originated policies (such as not serving wine with lunch, which did not go down well with French customers).

(Source: Pearson, 2008)

Activity 13.2: Influences on location decisions

Allow **40 minutes** for this activity.

As the Disneyland Paris case in Activity 13.1 illustrates, many factors can influence location decisions. Slack *et al.* distinguish between supply-side and demand-side influences. These factors are discussed in the next section of the chapter.

Task A

Now go to Slack *et al.* Chapter 6, pp. 158–61. Start with ‘Supply-side influences’ (p. 158) until ‘one of the best-known hotel chains in the world’ (p. 161).

There is no feedback for this task.

Task B

Now go to the short case ‘Developing nations challenge Silicon Valley’ (p. 160) and answer the questions.

Feedback

The initial attraction of these locations in developing countries was that of cost, particularly labour cost. Inevitably, there will be an economic ‘correction’ over time that will erode some of the advantages of these high-tech locations. At the moment the cost of developing high-tech products and software in these new locations is substantially lower than the cost in most western economies. As prosperity increases in developing nation locations due to the influx of new businesses, wages will tend to rise and costs increase. This will erode their advantage. However, this process could take many years (probably longer than ten). More important in the long term, other advantages may emerge that compensate for any marginal cost increase in the new locations. These advantages are likely to include an increasingly experienced labour force, improving infrastructure, and economies of scale (**Economy of scale**) as more and more industries relocate.

Silicon Valley locations still have advantages over their challengers in developing nations, particularly advantages of scale and experience. Silicon Valley still has the largest cluster of high-tech businesses in the world and it has developed a whole range of infrastructural support that may take years to develop in newer locations. Furthermore, it has many years of cumulative experience, which, although it may become less important as developing nations gain their own experience, is still a distinct advantage when tackling new high-tech projects. Maybe just as significant, the headquarters of the companies are largely located in the USA, so a Silicon Valley location is usually more intimately concerned with the day-to-day activities of a company generally.

(Source: Pearson, 2008)

Activity 13.3: Locating a new factory or fast-food restaurant

Allow **20 minutes** for this activity.

Task

List the main factors likely to be considered in locations for:

- a new factory
- a new fast-food restaurant.

Feedback

The location of a new factory is most likely to be decided primarily on the basis of minimising the costs associated with the site. The amount of product sold by the company is unlikely to be very much affected by its location, but its costs could be. Furthermore, there are likely to be a very large number of sites that the company could choose from.

The fast-food restaurant, on the other hand, involves a different sort of location decision. Both revenue and costs will be affected by location. Locating the restaurant away from other restaurants and/or away from passing trade is likely to mean a reduction in revenue. Some locations are better than others at attracting customers. Also, the costs of the location (such as rent and rates) are affected by location. Finally, with all this in mind, there are rarely a large number of options to choose from. Usually location is more opportunistic. The fast-food restaurant might wait until a site becomes available, and then take the decision as to whether to have that site or to wait in case a better one becomes available.

(Source: Pearson, 2008)

Activity 13.4: Location techniques

Allow **20 minutes** for this activity.

A number of techniques have been developed to help in the location decision-making process. Two of these are described in Slack *et al.*

Task

Now go to Slack *et al.* Chapter 6, pp. 161–3. Read from 'Location techniques' (p. 161) to the bottom of p. 163.

You will find it helpful to work through the examples for these techniques.

Feedback

It is worth noting that although the weighted-score method is quantitative in nature, it relies on subjective judgements to provide the numbers used in the calculations. On the other hand, the centre-of-gravity method is genuinely quantitative, relying on a knowledge distances and some measure of business (e.g., sales volume or value). However, the answer generated can only be used as an indication of the optimum location. More

subjective considerations will need to come into play when identifying an actual site, such as availability, accessibility and cost.

Session 13 summary

The purpose of this session was to outline the rationale of location decisions and examine the factors that underpin such decisions. The session also explored some simple techniques that can be used to aid location decision making. The next session is concerned with the physical layout of operations.

Now go to Session 14: Process technology or take a break before continuing.

Glossary

off-shoring

Off-shoring is the practice of re-locating an operation from a facility in the organisation's own country to one in another country.

Economy of scale

The manner in which the costs of running an operation decrease as it gets larger (Slack *et al.*, 2007, p. 700)

B203 Business functions in context

Session 14: Process technology

Prepared by David Barnes and Matt Hinton

Session 14	68
Introduction to Session 14	68
Activity 14.1: The nature of process technology	68
Activity 14.2: Processing technologies	70
Activity 14.3: DVD activity – design	71
Session 14 summary	72

Session 14

Introduction to Session 14

Previous: Session 13: Location decisions

Humans have used technology to help perform work ever since our earliest ancestors picked up pieces of wood and stone to form rudimentary tools. In the intervening years, technology has become much more complex but has also increased massively in capability. Organisations, as much as individuals, continue to seek to make best use of the technology available to them. In particular, a major concern of operations management is how to make best use of available technology in the management of business processes. Technology can be used in all process types, materials processing, customer processing and information processing, to improve both efficiency and effectiveness.

The main concerns of the operations function with regard to technology are twofold: first, determining what technology would be best for any given process; and second, making best use of that technology.

This session tackles these two interconnected issues. First, it provides an overview of the types of technologies that are available for processing materials, information and customers. It then considers how organisations set about determining what type of technology to use in their processes. In particular it considers the extent to which that technology should be automated, the scale of technology that should be adopted, and the degree to which the technology should be connected both within and between processes.

The session is based on material in Slack *et al.* Chapter 8 (pp. 220–51).

Activity 14.1: The nature of process technology

Allow **30 minutes** for this activity.

Slack *et al.* define process technology as ‘the machines and devices that create and/or deliver goods and services’ (p. 222). As the capability of these machines and devices seems to be increasing all the time, they are becoming more important to more and more operations and seem to perform more and more tasks.

Task A

Now go to Slack *et al.* Chapter 8, pp. 221–4. Start from the top of p. 221. Read to the end of the short case ‘Customers are not always human’ (p. 224).

Feedback

As well as providing some interesting examples of process technology in action in this section of the chapter, Slack *et al.* note the role of *indirect process technology* in some operations. Indirect process technology is technology that assists in the management of processes rather than directly contributing to the creation of products and services. They also note that some new technologies can process combinations of materials, information and customers. These are termed *integrating technologies*.

One of the main points to take from this study session is that although operations managers do not need to be technical experts in the way that the technology works, they do need to know about the principles behind the

technology. Slack *et al.* identify four key questions that need to be asked about any technology:

- 1 What does the technology do?
- 2 How does it do it?
- 3 What advantages does it give?
- 4 What constraints does it impose?

These questions can be applied whether the technology is aimed at processing materials, information or customers.

Task B

Now go to the short case 'Customers are not always human' on p. 223 and answer the questions at the end:

- 1 What advantages do you think the technology described gives?
 - 2 Do you think the cows mind?
 - 3 Why do you think the farmer still goes to watch the process?
-

Feedback

- 1 One would imagine that the main advantages that the technology gives are quality and cost. Quality is affected by the ability of the robot milkmaid to test the milk from each cow. This promotes not only the quality of the milk but also the long-term health of the cows. Cost is at least potentially lower (if the farmer does not go down to watch the machine all the time) because no labour is involved in the actual milking itself. Obviously, labour will be involved in cleaning and maintaining the machines, but presumably this is less than in more conventional milking systems.
- 2 Who is to know whether the cows mind or not? Presumably, if they did mind they would not voluntarily use the machine. It must, therefore, confer some benefit on the cows as customers. Just like humans, however, the cows have to be trained to use the technology.
- 3 It is difficult to know why the farmer likes to go to watch the milking machine in action. Perhaps he likes to make sure that his investment has been worth it. Perhaps, deep down, he does not trust the technology. What would happen if it jammed and the cows got stuck in the machine? It is unlikely that this happens very often, if at all, otherwise the farmer would not be still using the technology. However, the consequences of a technology failing is an important issue to consider when evaluating proposed new technology.

(Source: Pearson, 2008)

Activity 14.2: Processing technologies

Allow **60 minutes** for this activity.

In the next several pages of the chapter, Slack *et al.* describe some of the most important technologies currently operating in many business organisations. These are classified as either materials processing, information processing or customer processing.

Task A

Now go to Slack *et al.* Chapter 8, pp. 224–38. Read from ‘Materials-processing technology’ (p. 224) to the bottom of p. 238.

Do not dwell too long on the details of the technologies themselves. Rather, try to think about their implications for the business processes where they might operate by considering the four questions introduced above, namely:

- 1 What does the technology do?
 - 2 How does it do it?
 - 3 What advantages does it give?
 - 4 What constraints does it impose?
-

Feedback

Materials processing technologies

Materials processing technologies that can be used to form, shape and move materials are discussed on pp. 224–6. You should particularly note Table 8.2, which addresses the four questions in relation to each of the materials processing technologies mentioned in the chapter.

Information processing technologies

Information processing technology is more commonly referred to simply as information technology, or IT. This is discussed on pp. 226–34. Particularly when linked to the internet (when it is often referred to as ICT, or information and communication technology), IT is having a major impact on the way business is conducted, both within and particularly between organisations. Again note the way that Table 8.5 summarises the answers to the four questions that operations managers need to ask about technology, in this case information processing technology.

Customer processing technologies

Customer processing technologies are discussed on pp. 234–9. Slack *et al.* classify these technologies in terms of type of interaction between customer and the technology. This can be:

- Active interaction: in which a customer interacts directly with the technology (e.g., a bank’s ATM).
- Passive interaction: in which the customer has no, or very limited, control over the technology (e.g., cinemas and moving walkways).
- Hidden interaction: in which the customer is typically unaware of the technology (e.g., security cameras and bar code scanners).
- Interaction through an intermediary: in which the customer interacts with the person (typically a representative or employee of the processing organisation) who operates the technology (e.g., call-centres and travel agents).

Again note that Table 8.7 summarises the answers to the four questions which operations managers need to ask about technology – in this case, customer processing technology.

Task B

Choose one example of a materials processing operation, one example of an information processing operation and one example of a customer processing operation. For each example, list the process technologies that are used in these operations. For each of the process technologies, answer the four questions:

- 1 What does the technology do?
 - 2 How does it do it?
 - 3 What advantages does it give?
 - 4 What constraints does it impose?
-

Feedback

Your answers to this activity will clearly depend on the examples you choose. Tables 8.2, 8.5 and 8.7 will help you if you are struggling. You may also like to consider how recent changes and innovations in the relevant process technologies are likely to affect the way these operations use their process technology.

Activity 14.3: DVD activity – design

Allow **60 minutes** for this activity.

Task

Now go to the Vue DVD case, rewatch the clip on the DVD and answer the following questions:

- 1 What are the key characteristics of the design of the service provided by Vue cinemas?
- 2 How does the design match the needs and expectations of customers?

You may want to save your answers to a New note in MyStuff for Activity 14.3.

Feedback

- 1 The design of products and services can be considered at three levels (see Session 12):
 - The product concept – in this case a high-quality film viewing service offering an enjoyable entertainment experience for a mass market audience
 - The package providing these benefits – comprising an easily accessible, up-to-date and pleasant built environment, high-quality customer service, ease of ticket purchase (both online or via the retail counters), ancillary food and beverage products, high technical quality audio and DVD presentation.
 - The processes needed to provide this package, including the following design issues:
 - Location:* location of cinema close to local services;
 - Layout and flow:* scheduling films so that start and finish times are staggered to improve customer flow before/after
-

performances to maximise service quality, customer satisfaction and ancillary sales;

Technology:

- use of the latest digital technology to enhance technical quality and the guest experience;
- use of website to promote services, provide information, and sell tickets. This should aid capacity planning, reduce costs and provide a better service.

Other factors to be considered include:

Supply network: e.g., getting a commercially attractive deal with film distributors

Staffing: flexible job design, part-time work, knowledgeable and enthusiastic staff as a consequence of effective recruitment and development policies and practices; self-service by customers (e.g., online booking).

2 These various design features combine to meet the needs of customers, for example:

- competitive prices and a perception of value for money
 - good customer service (e.g., enough well-trained, friendly staff, when and where needed)
 - an enjoyable experience
 - appropriate choices of food/beverage products (to suit local tastes)
 - convenient parking/public transport
 - pleasant ambience
 - ease of ticket purchase, getting information.
-

Session 14 summary

Session 14 provided an overview of the types of technologies that are available for processing materials, information and customers. It then evaluated how organisations set about determining what type of technology to use in their processes. This session also analysed the extent to which that technology should be automated, the scale of technology that should be adopted, and the degree to which the technology should be connected both within and between processes.

Now go to Session 15: The nature of planning and control or take a break before continuing.

B203 Business functions in context

Session 15: The nature of planning and control

Prepared by David Barnes and Matt Hinton

Session 15	74
Session 15 introduction	74
Activity 15.1: What is planning and control?	74
Activity 15.2: Uncertainty	75
Activity 15.3: Planning and control activities	76
Activity 15.4: Air traffic Control – a world class juggling act	76
Session 15 summary	78
Glossary	79

Session 15

Session 15 introduction

Previous: Session 14: Process technology

This session is the first of five in this section that consider one of most important activities undertaken by the operations function: planning and control. This area is concerned with matching supply from the organisation's operations with demand from its customers. As such, it lies at the very core of operations management. If demand is greater than supply, some customers may be left dissatisfied. If supply is greater than demand, the organisation's operations are unlikely to be making best use of the resources at its disposal. Matching supply and demand is usually a difficult task, as demand typically varies over time, and changing output is usually not a straightforward task.

A number of specialist approaches and techniques have been developed that have proved to be particularly effective in certain types of operations. These include **just in time (JIT)**, which is the basis of lean production, and ERP (enterprise resource planning). These will be discussed in the other sessions of this section.

This session starts our consideration of this topic by examining what is meant by each of the two terms planning and control; what are the differences between them; and how they relate to each other. It goes on to identify different types of demand and the different approaches to managing supply that an operation can take in its attempts to satisfy that demand.

The session is based on material in Slack *et al.* Chapter 10 (pp. 288–319).

Activity 15.1: What is planning and control?

Allow **20 minutes** for this activity.

Planning and control are the two interrelated terms associated with activities aimed at reconciling the supply from an operation with the demand for its outputs.

Planning is concerned with deciding:

- what activities should take place in the operation
- when they should take place
- what resources should be allocated to them.

Control is concerned with:

- understanding what is actually happening in the operation
- deciding whether there is a significant deviation from what should be happening
- (if there is deviation) changing resources in order to affect the operation's activities.

This distinction sounds fine in theory. However, in practice, planning and control activities tend to merge into each other. This is especially the case in ongoing repetitive operations. The first few pages of Chapter 10 discuss this issue in more depth.

Task

Now go to Slack *et al.* Chapter 10, pp. 288–92. Start at the top of p. 288 and read down to ‘part of the operation also fails’ (p. 292).

Feedback

The focus of Slack *et al.*'s discussion is the way that planning and control activities change over time. Planning is more concerned with the medium to long term, whereas control is more concerned with the short to medium term. Figure 10.2 illustrates this clearly.

As p. 292 discusses, the nature of planning and control also varies with the volume and variety of the outputs of an operation.

Activity 15.2: Uncertainty

Allow **30 minutes** for this activity.

The difficulty of the planning and control task depends on the extent to which there is uncertainty in demand and supply.

Task

Now go to Slack *et al.* Chapter 10, pp. 292–7. Start with ‘The nature of supply and demand’ on p. 292 and read down to ‘risk out of planning and control’ (p. 297).

Feedback

Note the distinction between dependent and independent demand. The techniques of **materials requirement planning (MRP)** and its derivatives (including ERP, or enterprise resource planning) have been developed as responses to planning and control for **dependent demand** situations. However, many inventory planning and control situations involve **independent demand**. This is discussed in Session 17.

Slack *et al.* identify four distinctive ways in which operations can respond to demand:

- 1 Produce to stock – producing outputs prior to their being demanded by customers.
- 2 Part-produce to order – producing work in progress prior to outputs being demanded by customers.
- 3 Produce to order – producing outputs only when they are demanded by customers.
- 4 Resource to order – buying in resources and producing only when outputs are demanded by customers.

These distinctions are best thought of as a continuum rather than being clear-cut. **P:D ratios** (see pp. 296–7) can be thought of as a way of quantifying the graduation from ‘produce to stock’ to ‘resource to order’ and of characterising the risk taken in an operation’s approach to planning and control. Produce to stock (i.e., having a high P:D ratio) involves an organisation in the risk of carrying excess stock. Reducing the P:D ratio by

part-producing or producing only to order reduces that risk. Resource to order reduces the P:D to 1, thereby minimising the risk.

Activity 15.3: Planning and control activities

Allow **60 minutes** for this activity.

There are four interrelated sets of activities that need to be undertaken in order to plan and control the volumes and timing of outputs of an operation. These are:

- 1 Loading: allocating work to each stage (or work centre) of an operation.
- 2 Sequencing: deciding on the order in which work is to be performed.
- 3 Scheduling: producing a detailed timetable showing when each work activity should start and end.
- 4 Monitoring and controlling: checking any deviation from what has been planned and taking any corrective action required.

These are described in some detail in the remaining pages of the chapter.

Task

Now go to Slack *et al.* Chapter 10, pp. 297–313. Start from ‘Planning and control activities’ (p. 297) and read to the bottom of the short case ‘Routing and scheduling helps milk processor gain an extra collection trip a day’ (p. 313).

You should aim to read this fairly quickly. While it is important to be aware of the various techniques associated with each of the activities, it is not necessary to dwell on their detail or to try to remember them.

However, do note the distinction between **push control** and **pull control** (pp. 309–10 and as illustrated in Figure 10.15).

Activity 15.4: Air traffic Control – a world class juggling act

Allow **30 minutes** for this activity

Task

Now go to the case study ‘Air traffic control: a world class juggling act’ (pp. 315–16) and answer the following questions:

- 1 What does ‘planning and control’ mean to air traffic controllers?
- 2 What are the differing problems faced by TRACON, tower and ground controllers?
- 3 What sequencing rules do you think the tower controllers use?

Feedback

Although this case is not particularly representative of planning and control activities in most organisations, it does illustrate their complexities and dramatises the dangers of getting them wrong.

- 1 *Planning*. There are three elements to the planning task described in this case. The first concerns the drawing of the ‘invisible corridors’ in the

sky through which the planes are channelled. Related to this is the planning of how these invisible corridors are changed to cope with different weather conditions. In effect, this is route planning, a task that is undertaken in any transport operation. The second part of the planning activity involves setting out procedures for emergency situations, such as emergency landings. This will involve predetermined routines involving not only what happens to the plane subject to the emergency, but also the other traffic in the air space and on the ground during the emergency. The third part of planning will involve rough capacity planning. Airlines run to schedules and therefore it is possible to forecast the expected number of planes arriving in the air space at any particular time. So, if an aircraft is due at a certain point in air space at a particular time, it should be possible to forecast when that aircraft will become the responsibility of the tower controllers, when it will become the responsibility of the ground controllers and so on. Of course, this is in theory only. Contingencies will have to be built into the plan to account for variation in the actual arrival times of aircraft.

Control. Control in this case places particular emphasis on monitoring – in other words, knowing where all the aircraft are at any point in time. Any loss of information means loss of control. As with most control procedures, air traffic controllers will be comparing what should be happening (where the aircraft should be) against what is actually happening (where the aircraft actually is). The important issue here is that if a particular aircraft is not approaching according to plan, that will have an impact on all the other aircraft in the air space at the time. The final part of control therefore means adjusting the instructions given to each aircraft to take account of its position or deviation from position.

- 2 *The problems faced by TRACON controllers* are twofold. First, the aircraft must be kept apart while they are in a particular sector. This will involve closely monitoring the position, direction and speed of each aircraft and predicting their relative positions over time. In this the TRACON controllers are assisted by their computers, which help predict whether the aircraft are getting dangerously close, or will become dangerously close. The second issue for TRACON controllers will concern the handovers between different sectors. It is necessary for one controller to have charge of all aircraft in his or her air space because it is the position of the aircraft relative to each other that is important. However, the consequence of doing this is that there must be a handover between sectors. This is potentially a major failure point. Any failure to understand that responsibility has been passed on, or loss of monitoring, could be disastrous here.

The problem faced by tower controllers is that of capacity. The major bottleneck in capacity for air journeys is the airport itself. It is the tower controllers who schedule and control the passage of planes into and out of the airport. This is why the tower controllers at LeGuardia have to 'shoot the gap'. Although this is intrinsically risky, it increases the capacity of the airport substantially. Another issue for tower controllers is the variation between aircraft. The gap between planes taking off or landing is a function of the size of each aircraft because of the wake turbulence. This is equivalent to 'changeover times' in a factory. Just as changeover times for a machine will depend on what product is about to cease being processed and what product is about to be processed, so the gap between two aircraft depends on the size of each one.

The problem faced by ground controllers seems the least dangerous of the three areas. However, several accidents have been caused at airports by aircraft straying onto the runway. Ground control therefore is important from a safety point of view as well as from an efficiency point of view. To be efficient, ground controllers must move aircraft swiftly away from the runways so as not to cause bottlenecks or interfere with

other aircraft. Where the ground path cuts across runways, this is a particularly sensitive task.

- 3 The sequencing rules used by the tower controllers seem to combine a number of different considerations. Their starting rule seems to be 'due date' – in other words, prioritising landing slots according to the aircraft schedules. But this is probably only a rough guide for the controllers. 'First in, first out' rules, or orderly queuing, is also likely to be a principle they adopt. However, overriding all these will be a variant on the 'customer priority' rule that emphasises safety. Any aircraft that is short of fuel, or has an emergency on board, will always be given priority, irrespective of its due date or its position in the queue.

(Source: Pearson, 2008)

Session 15 summary

Session 15 outlined what is meant by each of the two terms 'planning' and 'control', what are the differences between them, and how they relate to each other. It went on to identify different types of demand and the different approaches to managing supply that an operation can take in its attempts to satisfy that demand. The next session looks at a specific area of planning and control associated with longer term capacity management, in particular, how and when to increase capacity by investing in additional facilities.

Now go to Session 16: Capacity management strategies or take a break before continuing.

Glossary

dependent demand

Demand that is relatively predictable because it is derived from some other known factor (Slack *et al.*, 2007, p. 700)

ERP (enterprise resource planning)

The integration of all significant resource planning systems in an organization that, in an operations context, integrates planning and control with the other functions of the business (Slack *et al.*, 2007, p. 700)

independent demand

Demand that is not obviously or directly dependent on the demand for another product or service (Slack *et al.*, 2007, p. 701)

just in time (JIT)

A method of planning and control and an operations philosophy that aims to meet demand instantaneously with perfect quality and no waste (Slack *et al.*, 2007, p. 702)

materials requirement planning (MRP)

A set of calculations embedded in a system that helps operations make volume and timing calculations for planning and control purposes (Slack *et al.*, 2007, p. 702)

P:D ratios

A ratio that contrasts the total length of time customers have to wait between asking for a product or service and receiving it (*D*) and the total throughput time to produce the product or service (*P*) (Slack *et al.*, 2007, p. 703)

pull control

A term used in planning and control to indicate that a workstation requests work from the previous station only when it is required, one of the fundamental principles of just-in-time planning and control (Slack *et al.*, 2007, p. 704)

push control

A term used in planning and control to indicate that work is being sent forward to workstations as soon as it is finished on the previous workstation (Slack *et al.*, 2007, p. 704)

B203 Business functions in context

Session 16: Capacity management strategies

Prepared by David Barnes and Matt Hinton

Session 16	82
Introduction to Session 16	82
Activity 16.1: The nature of capacity	82
Activity 16.2: Measuring demand and capacity	83
Activity 16.3: Alternative capacity management strategies	85
Activity 16.4: Choosing a capacity planning and control approach	85
Session 16 summary	87
Glossary	88

Session 16

Introduction to Session 16

Previous: Session 15: The nature of planning and control

This session focuses on the medium- and shorter-term issue of how organisations make best use of the capacity that is available to them within the physical constraints of their existing plant and equipment.

In this context, capacity management is also sometimes known as aggregate planning and control. The point is that demand for the outputs of an operation usually varies over time. It may vary seasonally over the course of a year. It may vary on a day-by-day basis over a month or a week. It may vary over the course of a week. It may vary depending on the time of day. The challenge for operations managers is how to manage the resources at their disposal to cope with such fluctuations in demand – satisfying customers, while meeting organisational objectives.

The session identifies some of the challenges of managing capacity and considers the different strategies available.

The session is based on material in Slack *et al.* Chapter 11, pp. 321–46.

Activity 16.1: The nature of capacity

Allow **15 minutes** for this activity.

In the opening section of the chapter, Slack *et al.* consider the nature of capacity and the challenges inherent in capacity planning and control.

Task

Now go to Slack *et al.* Chapter 11, pp. 320–4. Start at the top of p. 320 and finish at the bottom of p. 324.

Feedback

The challenge of capacity planning is to determine how to manage capacity over time in response to fluctuations in changes in demand. As Figure 11.2 points out, this involves three steps:

- 1 measuring aggregate demand and capacity
- 2 identifying the alternative capacity plans
- 3 choosing the most appropriate capacity plan.

The rest of this session mainly focuses on considering the issues associated with steps 1 and 2. It is worth noting that determining what is the most appropriate capacity plan will depend on the objectives that the organisation requires of its operations function. As is pointed out on pp. 323–4, capacity plans can affect an organisation's costs, revenues and working capital in addition to its operations performance objectives of quality, speed, dependability and flexibility.

Activity 16.2: Measuring demand and capacity

Allow **50 minutes** for this activity.

The first stage in capacity planning is measuring future demand and capacity. These are both difficult tasks in practice. Measuring future demand requires the organisation to undertake some kind of forecasting. The challenge of forecasting is discussed further in this section of Chapter 11, together with the problems of measuring capacity.

Task A

Now go to Slack *et al.* Chapter 11, pp. 325–32. Start at the top of p. 325 and to the bottom of the short case 'British Airways London Eye' (p. 332).

Feedback

As noted by Slack *et al.*, forecasts have to take into account seasonal, weekly and even daily fluctuations in demand. The short case 'Producing while the sun shines' draws our attention to the fact that the act of forecasting can be very costly. However, the cost of not forecasting can be even greater.

The section goes on to note the very real difficulties of measuring capacity. As the critical commentary on p. 330 points out, this is a contentious area.

Task B

Now go to the short case 'British Airways London Eye' on pp. 331–2 and answer the questions posed there.

Feedback

The design capacities can be calculated as follows:

Hourly capacity:

The wheel rotates one full revolution every 30 minutes. Thus the hourly capacity is:

$2 \text{ revs} \times 32 \text{ capsules} \times 25 \text{ passengers/capsule} = 1,600 \text{ passengers/hour.}$

Summer weekly capacity (April to mid-September):

The first passengers can board at 10:00 am, and can be scheduled to board continuously up to 10:00 p.m. (the end of the 9:30–10:00 p.m. slot). As there are 12 hours of boarding, the summer weekly capacity is 7 days x 12 hours x 1,600 passengers = 134,400.

Winter weekly capacity (mid-September to March):

The last slot is brought forward to end at 6:00 p.m. Thus winter weekly capacity is 7 days x 8 hours x 1,600 passengers = 89,600.

Annual design capacity:

This can be calculated from the number of days of operation. The attraction is closed only on Christmas Day, so it is open for 365 days = 52 weeks).

In the summer months, the London Eye operates for the following numbers of days:

- Apr: 30
-

- May: 31
- Jun: 30
- July: 31
- Aug: 31
- Sep (half month): 15.
- total summer period: 168 days (24 weeks).

Thus the annual capacity is:

- summer: $24 \times 134,400 = 3,225,600$
- winter: $28 \times 89,600 = 2,508,800$
- total: 5,734,400 (say 5.7 million).

The maximum theoretical design capacity:

This can be calculated assuming 52 weeks of operation at 168 hours per week. Thus, the maximum theoretical design capacity = $52 \times 168 \times 1,600 = 13,977,600$ (say 14.0 million).

The number of rotations in the first year of operation:

The number of rotations in a normal year can be calculated as follows:

- summer: $24 \text{ weeks} \times 7 \text{ days/week} \times 24 \text{ revs/day} = 4,032$
- winter: $28 \text{ weeks} \times 7 \text{ days/week} \times 16 \text{ revs/day} = 3,136$
- total = 7,168.

The press release referred to 6,000 revolutions per year, perhaps in anticipation of the need for planned maintenance periods or unplanned breakdowns.

Capacity utilisation:

This can be calculated from the formula:

Utilisation = actual output/design capacity (as discussed on p. 329)

For customer service operations, actual output can be taken to be the number of customers processed, which for 2000 was anticipated to be 2.2 million.

The design capacity is 5.7 million for a whole year. But this must be adjusted for the late start, as the London Eye was not ready until February. Thus the 31 days in January provide $31 \times 8 \text{ hours} \times 1,600 \text{ passengers/hour}$ of capacity = 396,800 (say 0.4 million).

Thus annual capacity for 2000 = $5.7 - 0.4 = 5.3$ million.

Thus utilisation = $2.2 \text{ million} / 5.3 \text{ million} = 41.5\%$.

This is anticipated to be less than 100% largely because of the lack of demand at off-peak times. Although some people may be prepared to attend at off-peak times simply to get a flight, there is no price incentive for them to do so.

In practice, there may further losses of utilisation for other reasons:

There may have to be periods of non-operation caused by:

- urgent maintenance requirements
- security alerts
- unsuitable operating conditions (e.g., high winds, blizzards).

There may be incomplete occupancy of each capsule, even during busy periods, due to:

- Group bookings – some passengers may be unwilling to travel with large groups of strangers, particularly if they are intoxicated. Conversely, large groups (e.g., corporate events) may resist the inclusion of small numbers of strangers on the flight.

- Late arrivals due to travel problems; insufficient numbers available for a given time slot.
- Shortage of passengers at the beginning of a time slot, since some passengers may believe that they simply have to turn up any time during the slot.
- Slower loading of disabled passengers, and possibly reduced capsule occupancy due to space taken by wheelchairs.
- 'No-shows' (customers who do not turn up). However, these may not be a problem if other passengers are available to take their slot (also they will have paid in advance!).

(Source: Pearson, 2008)

Activity 16.3: Alternative capacity management strategies

Allow **30 minutes** for this activity.

The second stage of capacity planning involves identifying alternative capacity plans. There are three generic ('pure') such strategies:

- level capacity (i.e., absorb demand)
- chase demand (i.e., adjust output to match demand)
- demand management (i.e., change demand).

These are explored in detail by Slack *et al.*

Task

Now go to Slack *et al.* Chapter 11, pp. 333–41. Read from the top of p. 333 until 'the configuration of seats' (p. 341).

Each of the three strategies has its own advantages and disadvantages, which are discussed in this section of Chapter 11. Do pay particular attention to the range of possible actions listed for both the chase demand and demand management strategies. The feasibility of each of these will depend on the type of operation being considered and the context in which it operates (market conditions, actions of competitors, local labour markets, legislation, etc.)

There is no feedback for this task.

Activity 16.4: Choosing a capacity planning and control approach

Allow **50 minutes** for this activity.

Choosing the most appropriate plan will depend on the particular circumstances of the operation under consideration, especially the objectives set for the operation by its organisation. While it is possible to find examples of organisations that operate each of these strategies in practice, many organisations operate a combination of all three.

The next section of the chapter discusses two approaches that Slack *et al.* claim can be helpful in assessing the consequences of any capacity plan being considered. The first of these is cumulative representations. This approach is most helpful in calculating the consequences, particularly the

financial consequences, of adopting a capacity plan designed to match supply with demand through the use of inventory. This involves making for stock (**make-to-stock**) in times of low demand. The excess stock can then be used to meet customer demand during peak periods. This is an important issue for many manufacturers, especially those serving seasonal markets.

Task A

Now go to the short case 'Seasonal salads' on pp. 333–4 and answer the questions:

- 1 What approach(es) does the company take to its capacity management?
- 2 What are the consequences of getting its planting and harvesting programmes wrong?

Feedback

- 1 The company mainly chases demand. This is because it has very little scope for doing anything else. It cannot keep the same levels of lettuce production, because the vegetable does not grow at the same speed throughout the year, nor can the product be put into inventory during times when production exceeds demand. The product has a very limited shelf life.

The company appears to chase demand in a number of ways. First, it subcontracts to its operation in Spain. Technically this is not subcontracting because the company owns the operation, but as far as the UK demand is concerned it is not using its own local facilities. The advantage of Spain is that it can grow the product during the time when the UK cannot. The disadvantage with using the Spanish operation is that there will be a time lag between picking the crop and it arriving in UK supermarkets. Given that the supermarkets can change their minds about buying a product at very short notice (because of weather fluctuations), this poses some risks for the grower. The lettuce might already have been picked and sent to the UK when the weather turns bad and supermarkets cancel their orders. The company also uses overtime and under-utilisation to cope with demand fluctuations. Its staff work through the night under floodlights, if necessary, to pick the lettuce. Finally, the company uses temporary seasonal staff to supplement its full-time employees.

- 2 The consequences of getting its planting and harvesting programmes wrong are very considerable, certainly higher than for (say) a manufacturing operation. If production in a manufacturing operation has to be reduced, then the machines stop and the staff do something else. The material which is being processed in the manufacturing operation does not usually deteriorate. With fresh produce, however, the raw material (the lettuce) has to be picked before a certain time or it will spoil. To some extent, the growing rate can be slowed down by adjusting the temperature if the product is grown under glass, but in the fields there is not much flexibility to slow down production. Thus excess capacity is a direct cost because the product cannot be recovered once it has been grown and wasted. Similarly, there is a limit to the extent to which lettuces can be accelerated through their growing period if demand is greater than expected.

(Source: Pearson, 2008)

Task B

Now go to the short case 'Getting the message' on p. 340 and answer the questions:

- 1 What seem to be the advantages and disadvantages of the strategy adopted by Hallmark Cards?
 - 2 What else could it do to cope with demand fluctuations?
-

Feedback

- 1 The main advantage is that non-occasion cards increase the company's total volume, which both increases the absolute amount of business and makes the fluctuations due to seasonal cards less important. The disadvantages come from the complexity associated with a vastly increased product range. This will be more expensive for the manufacturing operation, which makes them, the distribution operation, which handles the orders and delivers the cards to shops, and the shops themselves.
- 2 The strategy described in the box is one of 'managing demand'. The company seems to be doing this fairly effectively. It could, however, perhaps push this strategy further and create even more occasions to sell cards, or it could extend its operations overseas. For example, occasions like Mother's Day are often marked on different dates in different parts of the world. Unfortunately, other occasions like Christmas are (more or less) at the same time of the year everywhere. In addition, Hallmark could adopt a level capacity plan and/or a chase demand plan. In fact, it may very well do both these things to some extent. The box just highlights one part of the company's overall strategy.

(Source: Pearson, 2008)

Session 16 summary

This session identified some of the challenges of managing capacity and considered the different strategies available. This covered the nature of capacity, and measuring demand and capacity, as well as alternative capacity management strategies.

Now go to Session 17: Inventory management or take a break before continuing.

Glossary

make-to-stock

Operations that produce products prior to their being demanded by specific customers (Slack *et al.*, 2007, p. 702)

B203 Business functions in context

Session 17: Inventory management

Prepared by David Barnes and Matt Hinton

Session 17	90
Introduction to Session 17	90
Activity 17.1: The nature of inventory	90
Activity 17.2: Inventory volume decisions	91
Activity 17.3: Inventory timing decisions	92
Activity 17.4: Inventory analysis and control	93
Session 17 summary	93
Glossary	94

Session 17

Introduction to Session 17

Previous: Session 16: Capacity management strategies

Inventory management is an important issue in most, if not all, operations. People often tend to think that inventory is only an issue in materials processing operations, especially manufacturing. However, many service operations also use materials within their operations. Many services have physical products that form part of their outputs. Most services also use materials within their transformation processes, even if those materials form no part of their output supplied to customers. The fact is that there are different kinds of inventory; and some kinds of stock are more important than others.

In essence inventory exists to compensate for the differences in timing between supply and demand. There is one key dilemma at the heart of inventory management – namely: how much stock should be held? On the one hand, organisations will want to avoid the high costs of holding too much stock. On the other hand, organisations will want to avoid losing output (and potential lost income) by having too little stock. The level of stock an organisation holds will be affected by decisions about what quantities of materials to order from suppliers and by the timing of those orders. Operations managers have devised a number of different inventory management techniques and systems to help them address these decisions.

This session will consider the nature and importance of inventory. It will examine inventory quantity and timing decisions, and basic approaches to inventory analysis and control.

The session is based on material in Slack *et al.* Chapter 12, pp. 365–90.

Activity 17.1: The nature of inventory

Allow **60 minutes** for this activity.

In the opening section of the chapter, Slack *et al.* consider the nature and importance of inventory.

Task A

Now go to Slack *et al.* Chapter 12, pp. 365–72. Start at the top of p. 365 and end on p. 372 just after Figure 12.4.

Feedback

The chapter opens with the operations in practice case 'The UK's National Blood Service', which is used to illustrate the vital importance of inventory in some operations. In this case the adjective 'vital' really can be taken literally.

Notice how Slack *et al.* discuss the importance of inventory management in terms of the five operations objectives.

Slack *et al.* identify five different types of inventory, classified according to their role:

- buffer inventory
- cycle inventory
- de-coupling inventory

- anticipation inventory
- pipeline inventory.

On p. 371, Slack *et al.* also draw attention to the more common inventory classifications, which are based on their positions in the transformation process:

- raw materials and components
 - work in progress
 - finished goods.
-

Task B

Now go to the short case 'Howard Smith Paper Group' on pp. 382–3, and answer the question following:

Why has the Howard Smith Paper Group invested so much capital in automating its inventory storage and control capabilities?

Feedback

The technologies that the Howard Smith Paper Group has invested in are there to give it better performance in terms of quality, speed, dependability, flexibility and cost. Automated warehouses and computer-based control systems help ensure accuracy in fulfilling orders (quality), the ability to respond quickly to customer orders (speed), the ability to supply in a consistent and reliable manner (dependability), the ability to cope with changes in demand levels and the mix and products supplied (flexibility), and to do all of these things with a low level of cost. Presumably, the company's investments have enabled it to do all these things.

(Source: Pearson, 2008)

Activity 17.2: Inventory volume decisions

Allow **40 minutes** for this activity.

Decisions about how much to order are usually depicted as attempts to balance the costs associated with placing an order with the costs of holding stock. Slack *et al.* consider this in the next section of the chapter.

Task A

Now go to Slack *et al.* Chapter 12, pp. 372–81. Start from 'The volume decision – how much to order' (p. 372) and read to the bottom of p. 381.

Slack *et al.* derive and explain the well-known **economic order quantity** (EOQ) formula. Make sure you can apply this. Follow the worked examples in the chapter.

Task B

Now go to and tackle Problem 2 on p. 398 of Slack *et al.*

Feedback

The EOQ formula is:

$$EOQ = \sqrt{(2CoD/Ch)}$$

Where:

Co is the cost of placing an order

D is the annual demand (in units) for the item

Ch is the annual stockholding cost.

In this case:

Co = 75 euros

D = 15000

Ch = 25 euros

Thus, $EOQ = \sqrt{(2 \times 75 \times 15,000)/25} = 300$.

So the company should order 300 stethoscopes at a time.

Slack *et al.* go on to voice and discuss the criticisms of EOQ. These are important, not just because EOQ has been, and often still is, widely used in practice, without regard to its limitations. However, the effective rejection of the concepts of EOQ lies at the heart of the Japanese-inspired just in time (JIT) approach to inventory management. This will be considered in Session 18.

Activity 17.3: Inventory timing decisions

Allow **25 minutes** for this activity.

The issue of when to place an order is the next issue to be considered in the chapter.

Task

Now go to Slack *et al.* Chapter 12, pp. 383–88. Start from 'The timing decision – when to place an order' (p.383) and read until after Figure 12.15 (p. 388).

Feedback

In this section Slack *et al.* note that if the operation is to avoid running out of stock, the timing of its orders to its suppliers must take account of the order lead time. Most organisations normally also allow for some level of safety stocks to account for unpredictability in both demand and order lead time.

The discussion goes on to highlight two alternative approaches to the timing of the reorder decision:

- continuous review, in which an order is triggered when stock falls to a pre-determined minimum level

- periodic review, in which inventory levels are reviewed at regular intervals and, if necessary, stocks replenished to a pre-determined maximum level.
-

Activity 17.4: Inventory analysis and control

Allow **30 minutes** for this activity.

This section opens by introducing you to the concept of ABC analysis in inventory management. This is based on the well-known Pareto principle (**Pareto law**).

Task A

Now go to Slack *et al.* Chapter 12, pp. 388–91. Start from 'Inventory analysis and control' (p. 388) and end after the 'Critical commentary' on p. 391.

There is no feedback for this task.

Task B

Now go to and tackle Study Activity 1 on p. 398 of Chapter 12.

Feedback

By asking you to apply an ABC analysis (**ABC inventory control**) to your household inventory management, the activity requires you to relate your own everyday decisions to operations management theory. Reflect on how the information you calculate might change your behaviour. If it does not change your behaviour, why is this? Is it because:

- you are already operating an appropriate stock policy?
- there are other factors which you want to take into account?
- you can't be bothered?

(Source: Pearson, 2008)

Session 17 summary

This session outlined the nature and importance of inventory. It examined inventory quantity and timing decisions, and basic approaches to inventory analysis and control.

Now go to Session 18: Lean operations 1 or take a break before continuing.

Glossary

ABC inventory control

An approach to inventory control that classes inventory by its usage value and varies the approach to managing it accordingly (Slack *et al.*, 2007, p. 698)

economic order quantity

The quantity of items to order that supposedly minimizes the total cost of inventory management, derived from various EOQ formulae (Slack *et al.*, 2007, p. 700)

Pareto law

A general law found to operate in many situations that indicates that 20 per cent of something causes 80 per cent of something else, often used in inventory management (20 per cent of products produce 80 per cent of sales value) and improvement activities (20 per cent of types of problems produce 80 per cent of disruption)(Slack *et al.*, 2007, p. 703)

B203 Business functions in context

Session 18: Lean operations 1

Prepared by David Barnes and Matt Hinton

Session 18	96
Introduction to Sessions 18 and 19	96
Activity 18.1: JIT and the philosophy of lean	96
Activity 18.2: Toyota Production Systems	97
Activity 18.3: JIT techniques	97
Activity 18.4: JIT principles at Little Chef	98
Session 18 summary	100

Session 18

Introduction to Sessions 18 and 19

Previous: Session 17: Inventory management

Sessions 18 and 19 consider the philosophy and practices of the single most important development in operations management in the last 50 years (possibly longer). Labelled 'Just in time' (JIT) and, more recently, 'lean production' by western observers, this approach to managing operations is also, and perhaps more accurately, termed the Toyota Production System (TPS) in deference to the Japanese company which spawned it.

The concept of lean production developed under the singular conditions that appertained in Japan in the aftermath of the Second World War. At this time the country was struggling to re-establish its industrial base under US occupation and conditions of great privation and severe shortages of resources of all kinds. It also owes much to the unique character and context of Japan, a country with limited usable land and no natural resources, with a strongly homogeneous and collectivist society. It must be emphasised that the practices of lean took many years to emerge and are continuing to develop today. However, they are credited as being behind the undoubted success of Japanese manufacturing industry in the latter half of the twentieth century. Since then the lean approach has been widely copied and adapted by manufacturing organisations across the globe. At the time, lean was considered by many to be a radical departure from manufacturing orthodoxy. However, it has now become accepted wisdom and the basis of a so-called best practice or world-class model that its advocates argue should be adopted by all operations, services as well as manufacturing.

This session will describe and explain the philosophy and principal practices of lean production.

Sessions 18 and 19 are based on material in Slack *et al.* Chapter 15, pp. 464–88.

Activity 18.1: JIT and the philosophy of lean

Allow **40 minutes** for this activity.

Chapter 15 opens with a description of lean operations, its underpinning philosophy and the JIT techniques that are used to put this into practice.

Task

Now go to Slack *et al.* Chapter 15, pp. 464–74. Start at the top of p. 464 and read to the end of p. 474.

There is no feedback for this task.

Activity 18.2: Toyota Production Systems

Allow **20 minutes** for this activity

Task

Now go to the operations in practice case 'Toyota' p. 465 to familiarise yourself with how lean production operates in practice.

Also, visit Toyota's website to understand how Toyota itself describes the Toyota Production System.

Now go to [Toyota Production System](#) (Toyota Motor Corporation, 2008).

Feedback

Notice how lean production seeks to eliminate inventories in order to expose problems that can then be addressed, as illustrated in Figures 15.2 and 15.3. Also, as Figure 15.4 makes clear, the JIT approach requires a change in mindset. Traditionally, operations managers were schooled to believe that high levels of efficiency could only be achieved by striving for high capacity utilisation. JIT, on the other hand, tolerates lower capacity utilisation by placing the focus on producing only what is needed when it is needed. In JIT, greater efficiency is achieved by tackling the problems that lead to stoppages and waste.

As Figure 15.5 illustrates, the concept of lean is probably best thought of as an overarching philosophy, which is operationalised through a series of JIT techniques that includes the JIT method of planning and control.

Lean philosophy comprises three main elements:

- eliminate waste (in all its forms)
- involve everyone (through a team-based approach and a people-centred work culture)
- continuous improvement (in small steps, to expose waste and eliminate it).

These are discussed in more detail on pages 469–74.

Activity 18.3: JIT techniques

Allow **25 minutes** for this activity.

The next section of the chapter describes some of the many JIT techniques that have been developed.

Task

You can skim-read this section fairly quickly. Try to get a good overview of the various JIT techniques, but do not dwell for too long on their details.

Now go to Slack *et al.* Chapter 15, pp. 475–9. Read from the top of p. 475 to ‘...activities dealt with in other chapters’ (p. 479).

There is no feedback for this task.

Activity 18.4: JIT principles at Little Chef

Allow **25 minutes** for this activity

Task

Now go to the following short case, ‘JIT principles at Little Chef’, read it and answer this question:

Although Little Chef is different from a manufacturing company, some of the principles which apply in this case are similar to those used in a JIT manufacturer: What are they?

Short case: JIT principles at Little Chef

The Little Chef roadside restaurant chain has over 350 sites located on busy roads around the UK. All restaurants trade from 7.00 a.m. to 10.00 p.m., 364 days a year, and offer an all-day menu supplemented by part-day menus and various seasonal promotions. Customers receive a table service of cooked-to-order meals. Target times from ‘order taken’ to ‘food on table’ are 30 minutes for a starter plus main course, with an extra 10 minutes for a dessert. To achieve a high standard of customer service, it is necessary to forecast demand as accurately as possible and then to provide for sufficient resources (staff, food, etc.) to meet that demand. In practice, an all-year-round core of regular staff is maintained, supplemented by seasonal staff at peak periods. Staff planning is undertaken at three levels:

- 1 The quarterly manpower plan. The main input to this plan is the forecast number of customers for each of the 12 weeks of the forecast period.
- 2 The weekly forecast. The sales forecast from the quarterly plan is updated and broken down into daily sales.
- 3 The daily plans, which allocate duties between staff.

All materials (food, cleaning items and crockery) are obtained from a single supplier. This helps to ensure that goods are up to a consistent standard. Each restaurant has three deliveries a week, typically Monday, Wednesday and Friday, with orders being placed the same morning. A weekly stocktake records the consumption of each item. The manager uses a locally determined re-order level combined with forecast daily sales to compute material orders. Most foods are delivered and stored frozen, although salads and cured meats arrive date-coded, usually with four to five days’ shelf-life after delivery. Bread and milk are delivered daily by local suppliers. About seven days’ stock is held at any one time.

Each restaurant has a ‘menu manual’, which specifies the ingredients, cooking procedures and presentation standards for every item on the menu. Orders are added to the cook’s order pad, including the time

when the order was taken. The orders are marked once cooking has started, and marked again when cooking has finished. The cooking process is simple. The cooking equipment is also simple – griddles, fryers and pre-programmed microwave ovens. Similarly, a housekeeping board enables staff to see at a glance jobs which need to be done. Standard cleaning products and methods are used throughout the company, and each cleaning task is broken down into 'how, what, when' elements. To help ensure that standards are maintained across the network, quality audits are conducted every three months by the local training officer.

Tasks fall into eight categories; there is usually enough flexibility to react on a daily basis to changing needs, however. The categories are

- reception/cashier
- cooking/production
- beverage production
- sweet/salad production
- serving at tables
- re-laying tables
- washing up
- cleaning/toilet checks

Staff are cross-trained for greater flexibility (50 per cent of staff can cook). At quiet times, one person may perform more than one task. Facility flexibility is assisted by moveable tables and chairs so that parties of varying sizes can be accommodated.

Feedback

Several issues are very similar to those in a JIT manufacturer. Some of these are:

Limited product range: this helps to simplify the materials control task. The operation only produces 'runners' and 'repeaters'.

Simple products: which require only basic production equipment.

Pull scheduling: known customer orders are used to pull meals from the kitchen to the restaurant according to actual demand. There are no buffer stocks. The signal to make more is the order from the waiter/waitress. The routine is simple but strict: order one, make one, supply one in response to specific customer demand.

A batch size of one: orders are not held up (or batched) until a sufficient number has been accumulated, nor are they produced in advance; they are made on receipt of the order.

Flexibility: a standard time for serving a customer is aimed for irrespective of the demand level. This is done by varying the number of staff on duty.

JIT supply: replenishment stocks are delivered on a short order cycle from Little Chef's sole supplier, usually three times a week.

Visibility: recipes, preparation methods, pictures of ideal finished products and cleaning checklists are all examples of how key data can be made visible to all staff, for both control and audit purposes.

(Source: adapted from Pearson, 2008)

Session 18 summary

This session described the philosophy and principal practices of lean production. Although much of the session focussed on planning and control issues, in practice the 'lean' concept has much wider implications for improving operations performance. The next session will develop your understanding of 'just-in-time' processes.

Now go to Session 19: Lean operations 2 or take a break before continuing.

B203 Business functions in context

Session 19: Lean operations 2

Prepared by David Barnes and Matt Hinton

Session 19	102
Introduction to Session 19	102
Activity 19.1: JIT planning and control	102
Activity 19.2: JIT in service operations	102
Activity 19.3: JIT and MRP	103
Activity 19.4: DVD activity – planning and control	104
Session 19 summary	104

Session 19

Introduction to Session 19

Previous: Session 18: Lean operations 1

This session follows directly on from Session 18 – you can remind yourself about the content and aims of these sessions by taking another look at the Introduction to sessions 18 and 19.

Activity 19.1: JIT planning and control

Allow **30 minutes** for this activity.

The next section explains how JIT planning and control operates. Note that JIT is based on the pull system of planning and control introduced in Session 15.

Task

You can skim-read this section fairly quickly. Again, just concentrate on getting a good overview rather than dwelling on all the details.

Now go to Slack *et al.* Chapter 15, pp. 479–84. Start from ‘JIT planning and control’ (p. 479) to after Figure 15.10 (p. 484).

There is no feedback for this activity.

Activity 19.2: JIT in service operations

Allow **20 minutes** for this activity.

The next short section offers an interesting discussion about the possibilities of applying lean principles to service operations.

Task A

Now go to Slack *et al.* Chapter 15, pp. 484–5. Start from ‘JIT in service operations’ and read to the bottom of p. 485.

Feedback

Note how Table 15.3 points out the similarities between inventory (a queue of materials) in manufacturing and queues of information or customers in services. However, it is worth pointing out that putting the lean philosophy into practice in service operations is not usually entirely straight forward.

Task B

Now go to the short case 'A mobile parts hospital' on p. 486 and answer the following question:

Manufacturing parts through the process described is many times more expensive than using conventional technologies in a factory. How would you go about evaluating the advantages and disadvantages of using MPH units instead of holding stocks of spare parts?

Feedback

The two issues here are speed and mobility, not cost. When the effective 'cost' of not having a part or a service is very high (such as in the mobile army surgical hospitals), the actual cost of providing that part or service often becomes almost insignificant. In the middle of a battle a broken-down tank or truck is of little effective use. Considerations of cost at that moment do not rank very high. It is far more important to effect a repair quickly. This could be done by stocking spare parts. However, especially in complex equipment, stocking spare parts for every single part that could break would be difficult to achieve operationally. Even if (say) a spare parts kit could be organised it would need to be moved around with the piece of equipment it was supporting. This would inevitably reduce the mobility of that equipment – again, something that would render it less effective when in use.

(Source: Pearson, 2008)

Activity 19.3: JIT and MRP

Allow **20 minutes** for this activity

The chapter concludes with a comparison of MRP and JIT as planning and control systems.

Task

Now go to Slack *et al.* Chapter 15, pp. 486–8. Read from 'JIT and MRP' (p. 486) until Figure 15.11 (p. 488).

Feedback

Do be aware that operations management theoreticians and practitioners often hold quite strong views on the relative merits of MRP and JIT. Slack *et al.* argue that MRP is best suited to low-volume, high-variety production, where products and processes are complex. JIT, on the other hand, is best suited to high-volume, low-variety operations with simple products and processes. They also argue that MRP is good for planning, while JIT is good for control. These conclusions would be relatively uncontested by most operations management authorities. However, their claim that JIT and MRP can operate in combination is somewhat controversial and would undoubtedly provoke much more heated debate.

Activity 19.4: DVD activity – planning and control

Allow **50 minutes** for this activity.

Task

Now go to the bmibaby and Elm Surgery DVD cases and address the following:

- 1 Give one example from each organisation of an action aimed at coping with short-term fluctuations in supply and demand.
- 2 To what extent do these organizations use a manage demand strategy in order to manage capacity?

You may wish to save your notes to a New note in MyStuff for Activity 19.4 in MyStuff.

Feedback

- 1 bmibaby builds a 'firebreak' into its flight schedules. This gives it the scope to recover from delays (a problem with supply) that might be incurred in the preceding period so that the knock-on effect does not continue indefinitely.
Elm Surgery uses multi-skilled staff who can perform more than one role. This enables it to cover for absent colleagues, or provide a service when overall demand does not warrant employing a full-time person dedicated to a particular task.
 - 2 bmibaby relies heavily on a manage demand strategy that includes yield management, promotion and differential pricing.
Elm Surgery largely uses a level capacity strategy. It manages demand through its appointment booking system. To some extent it also tries to manage demand by providing information to patients so that they are aware of busy times.
-

Session 19 summary

This session built on session 18 which outlined the principal practices of lean operations. Critical to this is an understanding of just-in-time (JIT) processes and this session explored this in some depth, incorporating techniques for JIT as well as planning and control issues. Just-in-time's relationship to MRP was also considered.

Remember to keep in mind that you will need to submit TMA 01 at the end of your work on this block.

Now go to Session 20: The supply network or take a break before continuing.

B203 Business functions in context

Session 20: The supply network

Prepared by David Barnes and Matt Hinton

Session 20	106
Introduction to Session 20	106
Activity 20.1: The network perspective on operations management	106
Activity 20.2: Configuring the supply network	107
Activity 20.3: The outsourcing decision	109
Session 20 summary	110

Session 20

Introduction to Session 20

Previous: Session 19: Lean operations 2

This session introduces the concept of the supply network. Slack *et al.* define a supply network as 'the network of suppliers and customers that have a relationship with an operation'. The term 'supply chain' is also used in this context. However, 'supply network' better conveys the greater degree of complexity that represents the extent of the relationships that typically exist in practice for most organisations.

No operation exists in isolation, so studying the supply network is important because it sets the consideration of an operation in its wider operating context. The consideration of the supply network has become increasingly important in recent years as there has been a tendency for organisations to outsource more of their activities. Much of this outsourcing has been directed at suppliers whose operations are located in countries far away from the purchasers of their products and services. There has also been a trend for organisations to reduce the number of suppliers they deal with in order to work more closely with their preferred suppliers. However, there have also been other changes in supply networks as organisations have sought to capitalise on the opportunities offered by internet technology. This has led to the re-configuration of many supply networks. A process of 'disintermediation' has seen businesses 'cut out the middleman' and deal directly with their customers. However, many new kinds of intermediaries have also emerged. It has never been more important to study the operations function from a supply network perspective.

This session will explain the supply network perspective, examine the issue of its configuration and consider the vertical integration decision.

The session is based on material in Slack *et al.* Chapter 6, pp. 147–55.

Activity 20.1: The network perspective on operations management

Allow **40 minutes** for this activity.

The chapter opens with an explanation of the supply network perspective.

Task A

Now go to Slack *et al.* Chapter 6, pp. 147–51. Start at the top of p. 147 and read down to '...three related strategic decisions' (p. 151).

It is important that you master the terminology of the supply network as presented on these pages. Look particularly at the various definitions provided in the margins.

There is no feedback for this activity.

Task B

Now go to the operations in practice case 'Dell' on p. 148 and answer the following questions:

- 1 What advantages does Dell derive from its position in the supply network?
 - 2 Are there any disadvantages?
-

Feedback

- 1 Dell's position in the supply network means it can deal directly with its customers. This has enabled it to get much closer to them and better understand their needs. Its customisation processes enable customers to configure their purchases to their needs. Combining orders from its many customers, Dell has also been able to achieve the economies of scale of mass manufacturing. (Customisation on this large scale has been termed mass customisation.) The scale of Dell's operations also gives it big purchasing power with its suppliers, enabling to realise more cost savings. This further increases its ability to reduce its prices and increase its market share.
 - 2 The main weakness is that Dell has to rely on phone or web-based contact with its suppliers. The absence of direct face-to-face contact undoubtedly lessens the quality of its interactions with its customers. It also makes it more difficult for Dell to rectify any problems that might arise when customers receive its products. In the last few years, Dell has been subject to no little criticism from some of its customers who feel they have received poor after-sales service.
-

Activity 20.2: Configuring the supply network

Allow **25 minutes** for this activity.

The next section considers one of the key questions for all organisations, namely how to configure their supply networks.

Task A

Now go to Slack *et al.* Chapter 6, pp. 151–2. Read from 'Configuring the supply network' (p. 151) to '...the term used to capture this idea is 'co-opetition'' (p. 152).

Feedback

Recent years have seen a trend towards reducing the number of first-tier suppliers. One of the main drivers for this has been a desire to develop much closer relationship with suppliers – so-called partnership relationships. (These are discussed in more detail in Sessions 21 and 22.) The belief is that this can be done only by dramatically reducing the number of suppliers.

Task B

Now go to the short case 'Automotive system suppliers' on p. 152 and answer the following question:

What are the implications for companies reducing the number of their direct suppliers, both for the suppliers and for their customers?

Feedback

What is described here is happening in many industries. More publicity on the issue may be generated in the automotive sector than in others, but it is not uncommon in many manufacturing industries. Consider the following implications.

Implications for suppliers: A 'first-tier' system supplier is responsible for a very large 'component' of the final product, which the customer will see. Any failure on its part will have a very significant impact on its customer. It will itself have to take in many different components from its suppliers and integrate them before supplying the module to its customer. In effect, it is being paid by its customer not just to supply the module but also to manage the supply chain. Before, its customer would have done this. The supplier must therefore acquire far more sophisticated supply chain management skills. It will also find itself becoming increasingly powerful. It is more likely to have a single-supply agreement with its customer, which in the short term guarantees it business. The customer will not switch business to an alternative module supplier unless it has to. So, although it is doing a far more complex job, the first-tier supplier has a better short-term guarantee of business.

Implications for customers: By paying a module supplier to manage that part of the supply chain, the customer is putting considerable power into the hands of the supplier. It would have to be sure that it trusted its supplier not to take too much advantage of this. Furthermore, the customer trusts its supplier to be innovative and actively seek out new ideas in the market. A lazy module supplier, who does not actively encourage innovation in its own suppliers, is failing its customer in a fundamental way. However, the main advantage of having relatively few module suppliers is that the customer does not have to maintain relationships with a large number of suppliers; thus its costs of purchasing can be considerably lower.

(Source: Pearson, 2008)

Activity 20.3: The outsourcing decision

Allow **40 minutes** for this activity.

In the next section of the chapter, Slack *et al.* go on to discuss one of the other major supply network decisions: what to do in-house and what to outsource.

Task A

Now go to Slack *et al.* Chapter 6, pp. 152–5. Start from ‘Insource or outsource?...’ (p. 152) and read to the bottom of p. 155.

Feedback

The trend in recent years has very much been towards greater outsourcing. Many organisations seem to base outsourcing decisions purely on cost. This is to considerably oversimplify the issue. This section highlights the often complex set of issues that should be considered when deciding whether and what to outsource. Table 6.1 sets out the advantages and disadvantages of outsourcing, while Figure 6.4 captures the key points that need to be considered in the decision-making process.

Task B

Now go to the short case ‘Behind the brand names’ on p. 155 and answer the following questions:

- 1 What are the dangers to companies like Dell and Sony in outsourcing their notebook manufacture?
 - 2 Do you think subcontracting companies will compete with their clients in the future?
-

Feedback

- 1 There are three main types of danger involved in outsourcing manufacturing in the way that Dell and Sony have in this case. The first is that part of the supply process is outside of the brand holder’s direct control. For example, if the outsourcing company fails to ensure a robust process and supply is disrupted, it is the brand holder who will suffer (although compensation could be arranged). The second danger is that there may be a leakage of intellectual property. Subcontracting companies work for more than one brand holder. Indeed, their attraction is that they have experience in many different types of manufacturing tasks. There is always the danger that design information could inadvertently leak out to competitors. The third danger is that the brand holder may lose all the skills and competencies needed for a vital part of the process, namely manufacturing. If a very new design involves a very new technology that the outsourcing company cannot master, the brand holder will have to start from scratch in establishing competencies.

- 2 In fact it has already started! Increasingly, the subcontracting companies are developing design skills so that they are designing notebook computers, then offering that design, together with manufacturing services, to their customers. The danger in this is that the brand holders are left with literally nothing but the brand.

(Source: Pearson, 2008)

Session 20 summary

Session 20 explained how the consideration of the supply network has become increasingly important in recent years as there has been a tendency for organisations to outsource more of their activities. The concept of the supply network was analysed by taking a network perspective on operations management. The importance of configuring the supply network and the phenomenon of outsourcing are both highlighted as precursors to Session 21 on supply chain management.

Now go to Session 21: Supply chain management 1 or take a break before continuing.

B203 Business functions in context

Session 21: Supply chain management 1

Prepared by David Barnes and Matt Hinton

Session 21	112
Introduction to Sessions 21 and 22	112
Activity 21.1: Supply chain management	112
Activity 21.2: Purchasing and supply management	113
Activity 21.3: Global sourcing policy at Levi Strauss	114
Activity 21.4: Physical distribution management	114
Activity 21.5: Relationships within the supply chain	115
Session 21 summary	116

Session 21

Introduction to Sessions 21 and 22

Previous: Session 20: The supply network

Session 20 highlighted the importance of taking a supply network perspective in order to more fully understand the factors that affect the management of the operations function. The supply network is often also referred to as the supply chain and the act of managing the supply network is commonly known as supply chain management.

This session opens with a consideration of the objectives of supply chain management and how these relate to the wider performance objectives of an operation. It goes on to examine the main activities of supply chain management. On the supply side, these comprise the activities of purchasing and supply management; on the demand side, they comprise the activities of physical distribution management. The session then focuses on the issue of the relationships between suppliers and buyers within a supply chain. As with many aspects of supply, these relationships have been undergoing something of a radical change in recent years in many sectors of industry. The session closes by discussing ways of improving the performance of the supply chain.

The session is based on material in Slack *et al.* Chapter 13, pp. 400–27.

Activity 21.1: Supply chain management

Allow **20 minutes** for this activity.

The chapter opens with a discussion about the terminology and objectives of supply chain management.

Task

Now go to Slack *et al.* Chapter 13, pp. 400–4. Start at the top of p. 400 and read till ‘...to minimize transaction costs’ (p. 404).

Feedback

Slack *et al.* distinguish between the terms “supply network” and “supply chain”. They consider a supply chain to be a linkage or strand of operations that provides goods and services through to end customers. And they view a supply network as a collection of interrelated supply chains that cross through an individual operation. You should be aware that this distinction is not universally shared within the operations management community. It is more common to find the terms supply network and supply chain used more or less interchangeably.

In their discussion of supply chain management objectives, Slack *et al.* argue that the objective of any supply chain is to satisfy the end customer. However, doing this requires that managers identify the requirements of the end customers. Expressing these in terms of the five operations performance objectives (quality, speed, dependability, flexibility and cost) will provide a clear focus for decision making throughout the entire supply chain.

The section headed ‘The activities of supply chain management’ opens with a discussion of the terminology of supply chain management. Figure 13.3 illustrates some of the terms used. You should note, however, that –

confusingly – in practice many of these terms are used with much less clarity than Slack *et al.* imply.

The rest of this session is divided between a discussion of the supply side issues of purchasing and supply management, and the demand side issues of physical distribution management.

Activity 21.2: Purchasing and supply management

Allow **35 minutes** for this activity.

All organisations buy some of their resource inputs from external suppliers. The responsibility for this usually falls upon the purchasing function, which is often part of the operations function. Their activities are discussed in the next section of the chapter.

Task

Now go to Slack *et al.* Chapter 13, pp. 404–13. Start from ‘The activities of supply chain management’ (p. 404) and read until after ‘Short case: Extracts from Levi Strauss’s global sourcing policy’ (p. 412).

Feedback

The activities involved in industrial purchasing (see Figure 13.4) are usually much more complex than those undertaken by most individuals and households. These are necessary because of the impact that purchasing can have on an organisation’s financial performance, as the discussion on p. 406 and Figure 13.5 both demonstrate.

Sourcing, the activity of selecting which supplier to purchase from, is considered to be a vital task within the purchasing function. This section of the chapter highlights three sourcing issues currently enjoying much attention:

- 1 Single versus multiple sourcing: There has been a trend in recent years for organisations to move towards more single sourcing. However, as Figure 13.3 makes clear, there are advantages and disadvantages to both single and multiple sourcing.
 - 2 e-procurement: Over the last few years, many organisations have sought to capitalise on the internet as a vehicle for purchasing supplies. As the discussion on pp. 409–10 highlights, this offers many benefits. However, as the critical commentary box on p. 410 points out, it also has its critics.
 - 3 Global sourcing: Increasing economic globalisation has led many organisations to purchase numerous goods (and increasingly also services) from outside their own country. However, as discussed on p. 412, as well as many benefits, global sourcing – particularly from developing countries – can also bring some unexpected challenges for purchasers.
-

Activity 21.3: Global sourcing policy at Levi Strauss

Allow **15 minutes** for this activity

Task

Now go to the short case 'Extracts from Levi Strauss's global sourcing policy' on p. 412 and answer the following questions:

- 1 What do you think motivates a company like Levi Strauss to draw up a policy of this type?
 - 2 What other issues would you include in such a supplier selection policy?
-

Feedback

- 1 There are almost always two motives for companies from developed countries in drawing up this type of document. The first is straightforward ethics. Many organisations do take seriously their responsibility to improve working conditions in developing countries, even though there may be a price to pay in the sense that enforcing such working conditions may increase the cost of supplied products in the short term. Nevertheless, it is the second motive that is often regarded as the more powerful. This is that companies risk seriously damaging their reputation if it is discovered that they are using, from a developing country, suppliers whose practices are not acceptable to consumers in developed countries. This 'reputational risk' issue has become particularly important as consumers have become more sensitised to these issues and the media have realised the news value of such exposés.
- 2 The obvious omission in the extracts quoted in the short case concerns suppliers' suppliers. The emphasis in the document is on the direct suppliers to Levi Strauss. Yet there may be many contractors and subcontractors to these suppliers whose practices are not up to standard. Admittedly, this is a particularly difficult area in which to enforce the principles set out in the document, but some would argue that it is worth making an attempt. The other issue that the document only hints at is that many practices that are frowned upon in developed countries are seen very differently in developing countries. The issue of child labour, for example, may be appalling in many western consumers' eyes, but employing children may provide vital economic benefits in some parts of the world. This is not to say that Levi Strauss is wrong to insist on no child labour being used it is simply to point out that many of these issues look different from different perspectives.

(Source: Pearson, 2008)

Activity 21.4: Physical distribution management

Allow **25 minutes** for this activity.

Slack *et al.* provide a relatively brief consideration of physical distribution management. In the era of globalisation, however, the transportation of materials – whether raw materials, components or finished goods – has become an increasingly important issue for many businesses. A variety of organisations now outsource many aspects of physical distribution management to third party logistics specialists.

Task A

Now go to Slack *et al.* Chapter 13, pp. 413–14. Read from 'Physical distribution management' (p. 413) to the bottom of p. 414.

There is no feedback for this task.

Task B

Now go to the short case 'TDG, serving the whole supply chain' on p. 414 and answer the following questions:

- 1 Why do you think that David Garman is moving TDG towards providing more sophisticated services to clients?
 - 2 What are the risks in TDG's strategy?
-

Feedback

- 1 Providing more sophisticated services to clients offers TDG the prospect of higher profits. The problem with any company that produces simple products or services is that any other company can also do this. Therefore, because other companies have similar operations capabilities, prices will drop as each company tries to undercut the other. But other products and services (such as sophisticated supply chain distribution services) are far more difficult to create. This means that only the companies with the required resources and experience can provide them. And if a company has few competitors it can more easily maintain higher prices and (it is hoped) high margins. David Garman is moving towards providing more sophisticated services because it is more profitable for him to do so.
- 2 The main problem with trying to provide sophisticated products and services is that they are (as we described above) difficult to create. Companies providing them, therefore, are likely to be operating at the limit of their capability. Under these circumstances it is more likely that the company will make mistakes. The main danger with TDG's strategy is that it tries to offer sophisticated services before it has developed appropriate operations capabilities.

(Source: Pearson, 2008)

Activity 21.5: Relationships within the supply chain

Allow **30 minutes** for this activity.

The next section of Chapter 13 discusses the different sorts of relationships that can exist between suppliers and buyers.

Task

Now go to Slack *et al.* Chapter 13, pp. 415–20. Read from the top of p. 415 to the end of the 'Critical commentary' (p. 420).

Feedback

The different kinds of relationships in business-to-business markets are illustrated by Figure 13.7. Slack *et al.* note how in recent years supply chain relationships have tended to move from those based on traditional supply markets to those based on partnership. The requirements for supply partnerships to work effectively are listed on pp. 418–19. Many operations now rely on these kinds of close collaborative working relationships to satisfy their customers.

Session 21 summary

Supply chain management is an extensive concept which includes the management of the complete supply chain from the supplier of raw material to the end customer. This session considered the objectives of supply chain management and how these are related to the wider performance objectives of an operation. It then examined the main activities of supply chain management. The next session will develop your understanding of the relationships between suppliers and buyers within a supply chain.

Now go to Session 22: Supply chain management 2 or take a break before continuing.

B203 Business functions in context

Session 22: Supply chain management 2

Prepared by David Barnes and Matt Hinton

Session 22	118
Introduction to Session 22	118
Activity 22.1: Supply chain behaviour	118
Activity 22.2: Supply chain improvement	118
Activity 22.3: Agile Supply chains	119
Activity 22.4: DVD activity – the supply chain	120
Session 22 summary	120

Session 22

Introduction to Session 22

Previous: Session 21: Supply chain management 1

This session follows directly on from Session 21 – you can remind yourself about the content and aims of these sessions by taking another look at the Introduction to sessions 21 and 22

Activity 22.1: Supply chain behaviour

Allow **20 minutes** for this activity.

The next section of the chapter examines various aspects of supply chain behaviour.

Task

Now go to Slack *et al.* Chapter 13, pp. 420–3. Start with 'Supply chain behaviour' (p. 420) and read down to '...further back in the chain' (p. 423).

Feedback

Slack *et al.* report the work of Professor Marshall Fisher from Wharton, who argues that it is important to match the operations resources in a supply chain with the requirements of the markets it is serving (see Figure 13.8).

They go on to explain the well-known 'Bullwhip effect' which can bedevil supply chain management. This is the tendency of supply chains to amplify relatively small changes at the demand side of a supply chain such that the disruption at the supply end of the chain is much greater. This is well illustrated in Figure 13.9.

Activity 22.2: Supply chain improvement

Allow **30 minutes** for this activity.

The final section of Chapter 13 considers how the performance of the supply chain might be improved.

Task

Now go to Slack *et al.* Chapter 13, pp. 423–7. Read from 'Supply chain improvement' (p. 423) down to '...supply chain risks' (p. 427).

Feedback

Much of this discussion centres on the use of ICT, particularly internet-enabled ICT, to improve decision making in the supply chain through improved information sharing. Improving technology should mean that accurate and more comprehensive information can be provided much faster to decision makers throughout the supply chain. This can lead to the sorts of benefits available from time compression, as outlined in Figure 13.11. It is often claimed that effective supply chain management relies on replacing inventory with information. However, as the discussion on p. 427 makes

clear, there are also risks associated with inventory reduction, particularly in extended global supply chains.

Activity 22.3: Agile Supply chains

Allow **15 minutes** for this activity.

Task

Now go to the short case 'Seven-Eleven Japan's agile supply chain' on pp. 424–5 and answer the following questions:

- 1 SEJ stores typically carry around 3,000 SKUs (stockkeeping units; that is, types of different product), while a large supermarket may have over 10,000 SKUs. How do you think this affects their ability to manage their supply chain in an 'agile' manner?
- 2 SEJ places a lot of emphasis on the use of its information system to achieve 'agility'. How do you think the way in which an information system is used affects its value to a supply chain?

Feedback

- 1 The lower level of SKUs reduces the complexity of the supply chain considerably. This is particularly evident when the supply chain has to respond to unexpected events (in other words when it has to have an 'agile' supply chain). For example, if the company stored 100,000 SKUs it would need 100,000 safety stock and 100,000 different channels of communication to reorder and manage the flow of goods. It is obviously simpler to do this with 3,000 SKUs.
- 2 The key issue here is speed. And in supply chains the transparency of information assists fast response, both to customer requests and to unexpected events. SEJ's information systems are used to monitor what is happening both to sales and to the movement of goods through its supply chain. It is also used to modify plans based on what the company is observing in its supply chain and to make decisions without any unwarranted delay. Therefore, generally, to aid supply chain 'agility', information systems must be fast and transparent and be used to speed up decision reaction time.

(Source: Pearson, 2008)

Activity 22.4: DVD activity – the supply chain

Allow **60 minutes** for this activity.

Task

Now go to the Fuller's DVD case and answer the following questions:

- 1 Who are the main parties in Fuller's supply network?
- 2 What sort of relationships are in evidence in Fuller's supply network?

You may want to save your notes in a [new note in MyStuff for Activity 22.4.](#)

Feedback

- 1 The main parties in Fuller's supply network are:
 - Raw material suppliers. The suppliers of malt (a key ingredient, critical to the quality of its beer) and packaging are especially important.
 - Beer production. Fuller's has its own in-house beer production operation.
 - Packaging. Fuller's has its own in-house packaging operation (beer casking and bottling).
 - Distribution. Fuller's in-house transport operations deliver the product to its own pubs and other outlets.
 - Collection. Customer or third-party transport operations collect product from Fuller's brewery.
 - Own pubs. Some 13–14% of Fuller's product goes to its own 364 pubs.
 - 'Free trade' outlets (non-Fuller's pubs, clubs, bars etc). Fuller's also supplies a large numbers of pubs and other outlets that it does not own.
 - Supermarkets and other 'off-trade' sales. Sales to retail outlets for home consumption are increasingly important.
 - 2 Fuller's relations with its external supply network partners (and the managers of its own pubs) seem to be based on long-term close relationships. Fuller's relies heavily on both its suppliers and its customers. It needs to work closely with these, especially to drive the operations improvement initiatives that are so necessary in a highly competitive market.
-

Session 22 summary

This session built on session 21 which outlined the principal objectives of supply chain management by establishing that supply networks are made up of individual pairs of buyer-supplier relationships. In particular, this session explored the relationships between suppliers and buyers within a supply chain, drawing particular attention to supply chain dynamics and the notion of the responsive supply chain. With this in mind, this session looked at various attempts to coordinate and improve supply chain performance.

Now go to Session 23: Quality control or take a break before continuing.

B203 Business functions in context

Session 23: Quality control

Prepared by David Barnes and Matt Hinton

Session 23	122
Introduction to Session 23	122
Activity 23.1: The nature of quality	122
Activity 23.2: The quality gaps model	123
Activity 23.3: Quality as conformance to specification	124
Activity 23.4: Quality at Torres wine	124
Activity 23.5: Surgical statistics	126
Session 23 summary	127

Session 23

Introduction to Session 23

Previous: Session 22: Supply chain management 2

Quality is something that everyone seems to be in favour of. (When was the last time you heard a senior corporate manager say that their organisation was not dedicated to producing quality products and services?) Quality has been something of a hot topic in management for many years. Huge amounts have been written about it by academics, consultants and practitioners. You would think that every organisation ought to know exactly what it had to do to overcome any quality problems it might have. Yet the evidence is that organisations often fail to deliver the level of quality that their customers want. It goes without saying that quality is important to customers. If customers are satisfied – or, better still, delighted – then they will come back for more and recommend the organisation to others. So you would think that all organisations would want to meet or exceed their customers' expectations with regard to quality. Yet, in spite of what you expect to be their best intentions, organisations often fail to delight their customers.

Sessions 23 and 24 examine the issue of quality. This session will consider the nature of quality. It will review the various different definitions of the word 'quality' and speculate about what it is that makes quality so difficult to achieve in practice. It will go on to describe the 'conformance to specification' approach to managing quality. It will then highlight some of the most important tools and techniques that organisations currently use to help them manage quality. Session 24 will go on to examine what is undoubtedly the best known approach to managing quality, that of total quality management.

The session is based on material in Slack *et al.* Chapter 17, pp. 536–77.

Activity 23.1: The nature of quality

Allow **20 minutes** for this activity.

The first section of Chapter 17 considers the importance of quality but highlights the fact that there are many different definitions of the term.

Task

Now go to Slack *et al.* Chapter 17, pp. 536–9. Start at the top of p. 536 and read down to '...the cost of a direct flight' (p. 539).

Feedback

The operations in practice case 'Quality at the Four Seasons Canary Wharf' on pp. 537–8 offers an example of how one organisation gains a competitive advantage through the quality of its service. And Figure 17.2 (p. 539) illustrates all the potential reasons why improving quality should be seen as important to any organisation.

However, as Slack *et al.* go on to argue, the absence of a single accepted definition of the term 'quality' may lie behind the difficulties experienced by so many organisations when it comes to managing quality. Harvard Business School's Professor David Garvin categorises five approaches to

defining quality, summarised on pp. 538–9. This starts to explain why there is often confusion about how to manage quality.

Activity 23.2: The quality gaps model

Allow **30 minutes** for this activity.

Slack *et al.* argue that quality problems arise when there is a gap between the producer's view of quality and that of the customer

Task A

Now go to Slack *et al.* Chapter 13, pp. 539–44. Start from 'Quality – the operation's view' and finish just after Table 17.1 (p. 544).

Feedback

The basic idea of a quality gap is illustrated in Figure 17.3 (p. 541). A more comprehensive exploration of possible sources of quality problems is provided by the 'quality gaps model' of US researchers A. Parasuraman, Valerie Zeithaml and Leonard Berry as shown in Figure 17.4 (p. 542). The concept of the quality gap points to the importance of managing customer expectations as well as managing the quality of their experience of a product or service.

Task B

Now go to the short case 'Tea and Sympathy' on p. 541 and answer the following questions:

- 1 Why do you think 'Nicky's Rules' help to make the Tea and Sympathy operation more efficient?
 - 2 The restaurant's approach to quality of service seems very different to most restaurants. Why do you think it seems to work here?
-

Feedback

- 1 In effect, Nicky's Rules are a way of managing customers and their expectations exclusively for the benefit of operational efficiency. First, customers are warned that the waitresses are always right – in other words waitresses do not have to negotiate to get customers to do things, thus saving time and effort. Second, customers have to wait outside the restaurant until their entire party is present – customer groups must assemble themselves before entering the restaurant so the restaurant itself does not have to organise this. Third, customers are asked to change tables if necessary – this allows a closer match between demand and capacity. Finally, customers are told to 'naff off' after they have finished their meal if the restaurant is busy – this helps to achieve higher utilisation in times of heavy demand. The rules are strictly enforced – very heavy management of customer expectations here!

- 2 The restaurant's approach seems to work because of the novelty of the experience. Paradoxically, really bad service makes the character of the restaurant unique. The customers seem to appreciate being treated badly. This is unlikely to work in most businesses.

(Source: Pearson, 2008)

Activity 23.3: Quality as conformance to specification

Allow **60 minutes** for this activity.

The operations function is mainly responsible for making sure that there is no gap between the product or service that is produced and its specification. (This equates to Garvin's manufacturing-based approach to defining quality; see p. 538.) This leads to the conformance to specification approach to managing quality. The six steps involved in this approach are listed on p. 544 of Slack *et al.* and described on the subsequent pages.

Task

Now go to Slack *et al.* Chapter 17, pp. 544–51. Read from 'Conformance to specification' (p. 544) up to table 17.4

Feedback

Notice the list of quality characteristics listed by Slack *et al.* on p. 544. These need to be applied to the specific circumstances of any given operation, as with the examples listed in Table 17.2 on p. 545. Also, notice the distinction between variable and attributes when thinking about what quality measures should be used.

Activity 23.4: Quality at Torres wine

Allow **15 minutes** for this activity

Task

Now go to the short case 'Quality at Torres Wine' on pp. 547–8 and address the following:

- 1 What constitutes 'quality' for Torres's products?
 - 2 Chart the various stages in wine-making and identify what influences quality at each stage.
-

Feedback

1. Slack *et al.* define quality as consistent conformance to customers' expectations. For Torres, this means producing a range of products with consistent characteristics that meet the needs of their customers. The quality characteristics will include those listed in Table 23.1:

Table 23.1: Quality characteristics for Torres Wine

Quality characteristics	
Functionality	Tasty, alcoholic drinks.
Appearance	Appropriate colour, texture and smell to the wines and shape, colour and labelling of the bottles.
Reliability	Every bottle of the same type tastes (given year variations) the same.
Durability	The wine will keep for an appropriate length of time.
Recovery	Problems of consistency of wine quality, availability of supply and invoicing, etc. are rapidly dealt with.
Contact	The staff who deal with the suppliers and the wholesalers who buy their products are treated fairly and courteously.

2. The stages in wine-making and their influencing factors are presented in Table 23.2.

Table 23.2: Influences on quality at each stage of wine making

Stages in wine making	Key influences on quality
Grape growing	Correct grape for soil and climate Planting patterns Cultivation techniques Weather Diseases
Harvesting	Timing Temperature
Grape delivery	Speed from vineyard to wine maker Foreign bodies Cleanliness of grapes
Reception hoppers	Cleanliness Temperature
Quality assessment	Reliability of instruments Precision of tests
Mashing	Temperature Time Skin removal, where appropriate
Fermentation	Temperature Time Yeast content
Barrelling	Cleanliness Contamination
Ageing	Light Temperature Time

Bottling	Cleanliness Contamination
Bottle ageing	Light Temperature Time
Distribution	Handling

With so many factors influencing the quality of the wines, many of which are outside the control of the growers and the wine makers, it requires a significant amount of work to ensure the quality of the final products. Checks along the way, at every stage, are built in to ensure appropriate conditions. The cost of a failure at almost any stage could in some cases jeopardise an entire year's production. A failure in the ageing process could jeopardise several years' worth of wine.

(Source: Pearson, 2008)

As pointed out on p. 548, exercising control requires checking for conformance. In many instances, this is just not possible. Therefore some kind of sampling regime will need to be installed. Sampling is the basis of the use of statistical methods in quality control. Make sure you understand the distinction between type I and type II errors, which is explained on p. 551.

Activity 23.5: Surgical statistics

Allow **10 minutes** for this activity

Task

Now go to the short case 'Surgical statistics' on p. 552 and answer the following questions:

- 1 How does this new test change the likelihood of type I and type II errors?
- 2 Why is this important?

Feedback

1. The four possible outcomes are shown in Table 23.3.

Table 23.3: Type I and type II errors for appendectomy

Decision	Patient's condition	
	Appendectomy not required	Appendectomy required
Remove	Type I error	Correct decision
Do not remove	Correct decision	Type II error

Appendicitis is difficult to diagnose. Once it is suspected, surgery is undertaken to remove the appendix. Yet many doctors are wary about suggesting surgery because of potential problems, and costs. Thus both type I and type II errors are likely. The new technique is said to be 100 per cent effective in diagnosing appendicitis and so should significantly reduce both types of errors. It should eliminate type II provided doctors are willing

to use the test to check their diagnosis. It should also reduce type I errors, though doctors may be reluctant to pay for the test if they believe an appendectomy is not required.

2. The cost of errors is significant. A type I error subjects the patient to unnecessary risks through invasive surgery, and the hospital to unnecessary costs, tying up theatre and staff time where it is not needed. A type II error puts the patient's life in jeopardy, and the cost of surgery to clear a burst appendix, coupled with an extended stay in hospital, is significantly higher than the cost of a simple appendectomy.

(Source: Pearson, 2008)

Session 23 summary

Session 23 considered the nature of quality. It reviewed the different definitions of the word 'quality' and reflected on what it is that makes quality so difficult to achieve in practice. It then described the 'conformance to specification' approach to managing quality and highlighted some of the most important tools and techniques that organisations currently use to help them manage quality. Session 24 continues to develop the theme of quality.

Now go to Session 24: Total quality management or take a break before continuing.

B203 Business functions in context

Session 24: Total quality management

Prepared by David Barnes and Matt Hinton

Session 24	130
Introduction to Session 24	130
Activity 24.1: The nature of TQM	130
Activity 24.2: TQM at Hewlett-Packard	131
Activity 24.4: ISO9000	133
Activity 24.5: TQM implementation	133
Session 24 summary	134
Glossary	136

Session 24

Introduction to Session 24

Previous: Session 23: Quality control

Slack *et al.* introduce total quality management (TQM) as:

A holistic approach to the management of quality that emphasizes the role of all parts of an organization and all people within an organization to influence and improve quality; heavily influenced by various quality “gurus”, it reached its peak of popularity in the 1980s and 1990s. (p.651)

Although it has ceased to be such a hot topic as it was a decade or more ago, TQM continues to exert a powerful influence on the way that organisations think about and manage quality.

There can be few people who have not heard about TQM, but there is often considerable confusion about what it means and what it entails. This is not surprising. TQM is first and foremost a philosophy about how organisations should set about managing quality. It does not have a fixed list of activities that must be undertaken or a limited set of techniques that must be applied. Rather, there is a wide range of activities, tools and techniques that organisations may find useful in the pursuit of TQM.

TQM is based on the belief that:

- organisations need to make improving quality a central part of their operations
- quality improvement is the business of everyone in the organisation
- organisations should seek to improve every aspect of everything that they do
- the pursuit of quality improvement is a continuous and never-ending task.

This session will explain the concept of TQM in more detail and explore some of its most important constituents and challenges. It will also discuss two other quality tools: the ISO9000 quality management systems, and quality awards.

The session is based on material in Slack *et al.* Chapter 20, pp. 649–75.

Activity 24.1: The nature of TQM

Allow **40 minutes** for this activity.

In the opening section of the chapter, Slack *et al.* outline the origins and meaning of TQM.

Task

Now go to Slack *et al.* Chapter 20, pp. 649–58. Start at the top of p. 649 and read to the end of ‘Critical commentary’ (p. 658).

You can quickly skim through the section on the quality gurus unless you are particularly interested in their work. It is enough to understand the gist of their various contributions.

Feedback

Notice how Slack *et al.* argue that TQM builds on past ideas about quality management. Figure 20.2 on p. 653 illustrates this well.

One of the most significant advances that TQM brings to quality thinking is the way it emphasises the importance of understanding quality from the customer's perspective. This leads to the concept of the **internal customer**.

Activity 24.2: TQM at Hewlett-Packard

Allow **15 minutes** for this activity

Task

Now go to the short case 'Hewlett-Packard's internal customer checklist' on p. 655 and answer the following questions:

- 1 What is the strong point of the set of questions which comprises Hewlett-Packard's internal customer checklist? What are its limitations?
- 2 Do you think anything is missing from the problem-solving methodology described in the case?

Feedback

- 1 The strong point of the list is in getting individuals to focus on their own 'customer', internal or external. It does not, however, ask individuals to also consider their 'suppliers' to ensure 'total' quality management. Further, as can be seen from Figure 24.1 here, it does not give attention to quality systems and procedures.
- 2 On comparing the key tenets of TQM laid out in Chapter 20 with the list used by Hewlett-Packard, we can immediately see that the focus of HP's checklist is about meeting customer needs and expectations, i.e., understanding those needs and the process by which they are met. There is also some consideration given to process improvement. Since the pocket guides are distributed to everyone, the second tenet, covering all parts of the organisation, is possibly fulfilled, and the issue of getting people to work together, along the whole of the supply chain (internal and external) is covered by asking each person to consider their own customer. What is not explicitly covered is the examination of costs, the 'right-first-time' principle, and the development of quality systems and procedures.

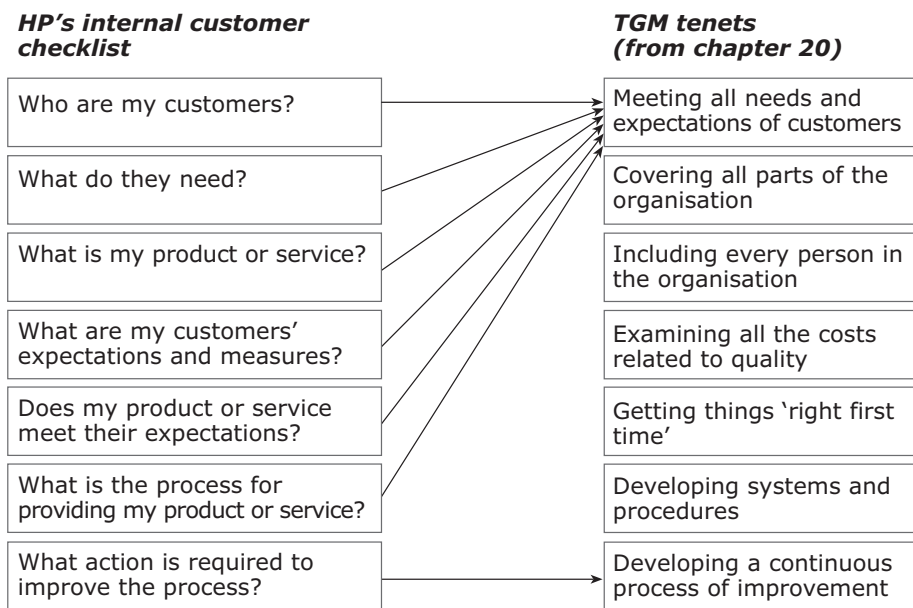


Figure 24.1: Comparing HP's internal checklist for quality with the key tenets of TQM (Source: Pearson, 2008)

Activity 24.3: Quality costs

Allow **20 minutes** for this activity.

One of the major contributions of TQM is its focus on the costs of quality. Expressing the significance of quality management directly in financial terms is guaranteed to get the attention of senior managers.

Task

Now go to Slack *et al.* Chapter 20, pp. 658–60. Start from 'All costs of quality are considered' (p. 658) and end with '...to a design-in (getting it right first time) approach' (p. 660).

Feedback

Make sure you understand the four different categories of quality costs, which are explained on p. 658. Notice how TQM rejects the notion of a trade-off between quality costs which was central to traditional thinking about quality.

Activity 24.4: ISO9000

Allow **20 minutes** for this activity.

The next section of the chapter discusses the ISO9000 quality management system.

Task

Now go to Slack *et al.* Chapter 20, pp. 660–3. Read from ‘Quality systems and procedures’ (p. 660) and read to the bottom of ‘Critical commentary’ (p. 663).

Feedback

One of the criticisms of TQM is that it can sometimes fail to provide clear guidance in the management of quality. The introduction of a quality management system is seen as one way of addressing this potential deficiency by offering an ordered and methodical approach to managing quality. ISO9000 is the best known of the many quality management systems in use.

ISO9000 is based on the principle of ‘Say what you do, and do what you say’. A quality manual and associated documents provide the way in which an organisation can say what it does. It can demonstrate that it does what it says through its operation of ISO9000, which requires the keeping of permanent records of all quality checks, tests and other activities. These enable the quality system to be audited by assessors from an ISO-approved certification body. The assessors inspect the quality manual and related documentation to ensure it complies with the requirements of ISO9000. They then inspect the organisation’s operations to ensure that what is written down actually happens in practice. A successful audit leads to the award of an ISO9000 certificate. Further regular inspection visits will be made to assess continued compliance. If serious faults are found, the certificate can be withdrawn.

However, it is worth noting that ISO9000 is not without its critics, as is discussed in the critical commentary box on p. 663.

Activity 24.5: TQM implementation

Allow **40 minutes** for this activity.

Translating the good intentions of TQM into practice requires a significant implementation effort. The chapter continues by discussing the challenge of TQM implementation.

Task A

Now go to Slack *et al.* Chapter 20, pp. 663–7. Start from ‘Implementing improvement programmes’ (p. 663) and read to the bottom of p. 667.

Feedback

This section of the chapter discusses the reasons why so many TQM initiatives fail. Although there are many different TQM implementation programmes, it seems that there are some features that are common to those that do succeed. These are identified on pp. 664–5.

Task B

Now go to the short case ‘Improvement at Heineken part II’ on p. 657 and answer the following question:

What might explain the ‘slump’ in motivation for improvement during periods of low demand, and after the consultants stepped back from the initiative?

(You will find it helpful to read part I of the case on pp. 581-2.)

Feedback

There may be different reasons behind these two slumps in motivation. The lack of motivation when demand is low is something of a paradox. On the one hand, you might think that there would be more time to effect improvement when the plant is not working to its full capacity. On the other, there is less need to increase the efficiency of the plant when it is easy to produce the required output within the plant’s capacity. ‘Why improve performance anyway when we have enough capacity to produce what we need?’ may be the attitude here.

The slump when the consultants phase themselves out is more common. It is also partly a failure on the consultants’ part. They were obviously fulfilling a role (monitoring and recording improvement, for example) that was not catered for within the organisation’s regular staff. Only after these responsibilities were allocated internally did the improvement initiative regain its momentum.

(Source: Pearson, 2008)

Session 24 summary

Session 24 presented TQM as ‘a philosophy about how organisations should set about managing quality’. It stressed that TQM does not have a fixed list of activities that must be undertaken or a limited set of techniques that must be applied. Rather, there is a wide range of activities, tools and techniques that organisations may find useful in the pursuit of TQM. The session explored in detail some of TQMs most important constituents and challenges, and outlined the importance of the ISO9000 quality management systems. The next session will develop your understanding of performance improvement.

Now go to Session 25: Performance improvement 1 or take a break before continuing.

Glossary

EFQM Excellence Model

A model that identifies the categories of activity that supposedly ensure high levels of quality; now used by many companies to examine their own quality-related procedures (Slack *et al.*, 2007, p. 700)

internal customer

Processes or individuals within an operation who are the customers for other internal processes or individuals' outputs (Slack *et al.*, 2007, p. 701)

B203 Business functions in context

Session 25: Performance improvement 1

Prepared by David Barnes and Matt Hinton

Session 25	138
Introduction to sessions 25 and 26	138
Activity 25.1: Measuring performance	138
Activity 25.2: The balanced scorecard	139
Activity 25.3: Benchmarking	139
Activity 25.4: Setting performance priorities	141
Activity 25.5: Applying the importance-performance matrix	142
Session 25 Summary	142
Glossary	143

Session 25

Introduction to sessions 25 and 26

Previous: Session 24: Total quality management

In many respects, the whole of operations management can be seen as an attempt to improve the performance of the operations function. However, there are some specific approaches to improving performance that will be the focus of this session.

Before any improvement initiative is undertaken, managers need to address a more fundamental question: 'How good (or bad) is our current level of performance?' This is the concern of performance measurement. One of the key concerns of performance measurement is determining which aspects of performance to measure. However, measuring performance is of itself not particularly useful unless there is some kind of comparator against which to assess current performance. Also, managers must decide which aspects of performance need to be given priority if their performance improvement efforts are not to be dissipated over too wide a range of activities.

Sessions 25 and 26 will consider all these aspects of performance measurement. It will then go on to consider two radically different approaches to achieving performance improvement; namely breakthrough (i.e., radical) improvement, and incremental (i.e., continuous) improvement. The session will close by considering some specific improvement techniques.

The session is based on material in Slack *et al.* Chapter 18, pp. 580–615.

Activity 25.1: Measuring performance

Allow **20 minutes** for this activity.

Performance measurement can be termed the process of quantifying action. It is an essential precursor to any effort to improve performance.

Task

Now go to Slack *et al.* Chapter 18, pp. 580–4. Read from the top of p. 580 to '...to judge an operation's performance' (p. 584).

Feedback

Polar diagrams can be a useful way of depicting performance in the five performance objectives for any operation (i.e., quality, speed, dependability, flexibility and cost). They can also prove useful when making comparisons with actual and desired levels of performance (as depicted in Figure 18.2).

Activity 25.2: The balanced scorecard

Allow **20 minutes** for this activity.

Knowing what to measure has always been a vital part of performance measurement. Many organisations use the term 'key performance indicators' (KPIs) to describe the most important measures for their operations. One highly influential tool used to determine what should be measured is the balanced scorecard (BSC).

Task

Now go to Slack *et al.* Chapter 18, pp. 584–6. Read from 'The balanced scorecard approach' (p. 584) to after Figure 18.4 (p. 586).

Feedback

The two most important aspects of the BSC are its insistence on a wider range of performance measures than might otherwise be used, and its ability to link performance measurement to an organisation's strategic objectives (as depicted in Figure 18.4).

Activity 25.3: Benchmarking

Allow **30 minutes** for this activity.

In order to determine whether current levels of performance are acceptable, operations managers need the means of comparing the operation's performance against some target. As the next section of the chapter points out, there are several approaches to target setting.

Task A

Now go to Slack *et al.* Chapter 18, pp. 586–8. Read from 'Setting target performance' (p. 586) until the end of 'Critical commentary' (p. 588).

Feedback

Benchmarking is a valuable means of assessing the performance of a process by comparing it to that of other processes. This can clearly provide operations managers with useful information. However, benchmarking becomes even more valuable when it is used as a learning device. This is achieved by comparing processes methods with those used in other processes in order to learn from them.

Task B

Now go to the Xerox benchmarking short case study and answer the questions below:

Short case: Xerox benchmarking

Possibly the best-known pioneer of benchmarking in Europe is Rank Xerox, the document and imaging company which created the original market for copiers. The virtual monopoly the company had in its sector almost became its undoing, however. Spurred by the threat from the emerging Japanese copier companies, an in-depth study within the company recognised that fundamental changes were needed. To understand how it should change, the company decided to evaluate itself externally – a process which became known as competitive benchmarking. The results of this study shocked the company. Its Japanese rivals were selling machines for about what it cost Xerox to make them. This could not be explained by differences in quality. The study found that, when compared with its Japanese rivals, the company had nine times more suppliers, was rejecting ten times as many machines on the production line and was taking twice as long to get products to market. Benchmarking also showed that productivity would need to grow 18 per cent per year over five years if it was to catch up with its rivals.

Rank Xerox sees benchmarking as helping it achieve two objectives. At a strategic level it helps set standards of performance, while at an operational level it helps the company understand the best practices and operations methods which can help it achieve its performance objectives. The benchmarking process developed by Rank Xerox has five phases. Its experience of using this approach has led Xerox to a number of conclusions.

The first is that the initial phase, planning, is crucial to the success of the whole process. A good plan will identify a realistic objective for the benchmarking study, one which is achievable and clearly aligned with business priorities.

Second, a prerequisite for benchmarking success is a thorough understanding of your own processes. Without this it is difficult to compare your processes against those of other companies.

Finally, look at what is already available. A lot of information is already in the public domain. Published accounts, journals, conferences and professional associations can all provide information which is useful for benchmarking purposes. Be sensitive in asking for information from other companies. The golden rule is: 'Don't ask any questions that we would not like to be asked ourselves.'

Questions:

- 1 What kind of information did Xerox discover in its benchmarking study?
 - 2 Of the five performance objectives (quality, speed, dependability, flexibility, cost), which do you think are the most difficult to discover about your competitors' performance?
-

Feedback

- 1 The benchmarking study revealed information about its competitors' performance as follows:
 - *Cost.* Although few direct details of costs seem to have been revealed, it was clear that competitors had lower costs because they were selling their products for what it cost Xerox to make them.
 - *Quality.* Ten times as many mistakes were being discovered on Xerox's lines than on those of its competitors.
 - *Supply chain management.* Xerox had nine times the number of suppliers to manage than its competitors had.
 - *Speed.* Xerox was taking twice as long as its competitors to design and make its new products from concept through to market launch.
- 2 The fine details of cost will always be difficult to discover. Cost is measured in different ways by different companies and is likely to be some of the most confidential information. However, a broad idea of a competitor's costs can be gained by looking at who it buys its parts from, how many staff it has, how much of its activities are performed in-house as opposed to being outsourced, and so on.

Quality, speed and dependability are usually easier to benchmark. Often your customers are also customers of your competitors. Your customers will soon tell you if your quality, speed and dependability are substantially below your competitors'. Also, quality can be partially judged by buying your competitors' products and testing them.

Perhaps the most difficult thing to find out about your competitor is its flexibility. Often your competitor will not know how flexible it is, because flexibility is a complex and multidimensional aspect of operations performance.

(Source: Pearson, 2008)

Activity 25.4: Setting performance priorities

Allow **30 minutes** for this activity.

Benchmarking can help operations managers understand how aspects of current performance may be falling short of that desired. It may even suggest how that shortfall may be addressed. However, operations managers still need to decide which aspects of performance should be given highest priority. Slack *et al.* offer the **importance–performance matrix** as a means of addressing this issue.

Task

Now go to Slack *et al.* Chapter 18, pp. 588–93. Read from 'Improvement priorities' (p. 588) to the end of the worked example on p. 593.

Feedback

Notice how the matrix classifies performance as either:

- requiring *urgent action*
 - needing to *improve*
 - *appropriate*
-

- potentially excess.
-

Activity 25.5: Applying the importance-performance matrix

Allow **20 minutes** for this activity

Task

Choose an operation that you know well (as a customer, or because you work or have worked for the organisation concerned). Use the importance-performance matrix to set some performance improvement priorities for the operation.

This activity requires you to undertake the following actions:

- 1 Identify the set of competitive factors that have most relevance for this operation. You might use the five performance objectives of quality, speed, dependability, flexibility and cost as a starting point.
 - 2 Rate each of these on the nine-point importance scale.
 - 3 Now rate each of these against the nine-point performance scale.
 - 4 Position each aspect of performance on the importance-performance matrix (see Figure 18.6).
 - 5 Use the matrix to draw up a list of improvement priorities.
-

Feedback

Obviously, your answer to this exercise will depend on your assessment of the operation that you have selected to examine.

Session 25 Summary

This session has covered several key aspects of performance improvement. This encompassed a range of performance measurement approaches (most notably the balanced scorecard and benchmarking). The session also established the importance of setting performance priorities. The next session continues your work on performance improvement.

Now go to Session 26: Performance improvement 2 or take a break before continuing.

Glossary

importance–performance matrix

A technique that brings together scores that indicate the relative importance and relative performance of different competitive factors in order to prioritize them as candidates for improvement (Slack *et al.*, 2007, p. 701)

B203 Business functions in context

Session 26: Performance improvement 2

Prepared by David Barnes

Session 26	146
Introduction to Session 26	146
Activity 26.1: Breakthrough vs continuous improvement	146
Activity 26.2: Improvement on track	146
Activity 26.3: DVD activity – quality	148
Activity 26.4: DVD activity – performance	149
Session 26 summary	149
Glossary	150

Session 26

Introduction to Session 26

Previous: Session 25: Performance improvement 1

This session follows directly on from Session 25 – you can remind yourself about the content and aims of these sessions by taking another look at the Introduction to sessions 25 and 26

Activity 26.1: Breakthrough vs continuous improvement

Allow **40 minutes** for this activity.

The next section of the chapter goes on to compare breakthrough improvement and continuous improvement.

Task

Now go to Slack *et al.* Chapter 18, pp. 594–602. Start at the top of p. 594 and read till the end of 'Critical commentary' on p. 602.

Feedback

It is worth noting that breakthrough improvement is often viewed as a characteristic of many western organisations, which tend to favour innovation and technology as the means of improving performance. On the other hand, many Japanese organisations seem to favour continuous improvement (*kaizen*), which is more people-driven. As well as highlighting the difference between these two approaches, Slack *et al.* argue that organisations need to embrace both approaches in order to realise the greatest improvements in performance over time.

Slack *et al.* highlight quality guru, W.E.Deming's well-known **PDCA cycle** and the **DMAIC cycle** used with six sigma (covered in Activity 24.5: Six sigma in Session 24) in as examples of continuous improvement techniques (pp. 597–8). In comparison, they point to business process re-engineering (BPR) as an example of breakthrough improvement (pp. 598–602).

Activity 26.2: Improvement on track

Allow **20 minutes** for this activity

Task

Now go to the following Alstom short case study and answer the questions below.

Short case: Improvement on track

Alstom Transporte SA-Systems Maintenance, the Spanish transport services company, is part of the Alstom engineering and transport group. It provides a whole range of services to railway operators,

mainly in Spain, Portugal and South America. Although the company's history of pioneering quality management goes back to the 1960s, it was in the late 1990s that it received Spain's highest prize for quality, the Principe Felipe Award. Such a reputation for quality is a valuable asset in an increasingly competitive market, says Ms Toledo del Castillo, its director of quality and environment. 'We are continually looking for innovation in our contracts and the way we deliver our services because each of our customers wants us to give more or better service for a lower price. The continuous improvement of our processes is the only way to make our company more efficient.'

The company uses a defined set of criteria to identify particularly critical processes within its operations. Each process is allocated a 'process owner' by the company's quality steering committee. Because the company's sites are widely spread, it is important that excellence in process management practice is identified and the lessons learned throughout the company. This is helped by the company's 'process excellence index' (EPI), which is an indicator of the way a process performs – particularly how it is designed, controlled and improved. The EPI score, which is expressed on a scale of 1 to 100, is calculated by the process owner and registered with the quality department. 'With one figure we know the state of a process in such a way that we can measure the cost, reliability and quality of each process so that we can compare performance. If you don't measure, you can't improve. And if you don't measure in the correct way, how can you know where you are?'

Employee recognition is also an important part of the company's improvement strategy. The company's suggestion scheme is designed to encourage staff to submit several linked ideas at one time. These can be evaluated and rated as a portfolio of suggestions from each employee. No individual suggestion is finally evaluated until it has been fully implemented. Where ideas are put forward by a team of employees, the EPI score is divided between them, either equally or according to the wishes of the team itself. These employee policies are supported by the company's training schemes, many of which are designed to ensure all employees are customer-focused. 'Not everyone has direct contact with customers, so training is a way to get them all to think as a customer and handle customer enquiries and complaints. If people assume that the customer is wrong, it becomes difficult to make sure they are helped,' says Ms Toledo del Castillo.

Questions:

- 1 What seem to be the key elements in this company's approach to improvement?
- 2 Do you think this approach is appropriate for all operations?

Feedback

- 1 The company's approach to improvement could be classed as relying on a continuous improvement philosophy. This is driven by the need to deliver better services to customers and reduce the price of its services; in other words, to break the trade-off between service and cost. This is supported by the following activities:
 - allocating a process owner to take responsibility for quality improvement in the process

- identifying the lessons learned in one part of the company and communicating them effectively throughout the rest of the company
 - measuring performance in the form of an overall index, the process excellence index
 - recognising employee contribution to the improvement strategy through the use of a suggestion scheme
 - investing in training as a way to encourage a customer focus.
- 2 This approach is not appropriate for all operations. No one approach is relevant to every single type of operation. For example, the EPI score used by the company obviously has some benefits in terms of its simplicity of use, but must be an oversimplification in some parts of the operation. In businesses where output is difficult to measure (such as an educational establishment or a management consultancy), such a simple index would not reflect the real nature of operation performance.

(Source: Pearson, 2008)

Activity 26.3: DVD activity – quality

Allow **30 minutes** for this activity.

Task

Now go to the Fuller's DVD case and answer the following question:

Why is managing quality so important to Fuller's operations?

You may want to save your notes to a [New note in MyStuff for Activity 26.3.](#)

Feedback

Fuller's business strategy is based on offering a premium product to its customers and charging a premium price. Its business model is especially reliant on error-free processing throughout its operations. So Fuller's goes to great lengths to ensure the quality of its products through various and frequent quality checks at all stages in its production process. It relies heavily on the chemical tests undertaken by its laboratory staff. It also checks the appearance, smell and taste of its products at the daily tasting panels.

Activity 26.4: DVD activity – performance

Allow **45 minutes** for this activity.

Task

Now go to the Vue DVD case and address the following:

- 1 What benefits does Vue get from its use of a balanced scorecard approach to performance measurement and management?
- 2 Suggest an external benchmark that Vue could use apart from another cinema chain.

You may want to save your notes to [a New note in MyStuff for Activity 26.4](#)

Feedback

- 1 Vue's balanced scorecard measures performance in four areas: people, sales, quality and continuous (efficiency) improvement. Each employee in the company has their own balanced scorecard – an interpretation of what performance in each aspect means for their particular role. Thus it is a way of managing individual members of staff, managers and indeed the entire organisation – it is much more than just a framework for performance measurement. It is relatively straightforward for people to understand and relates directly to the critical success factors for the business as a whole. It helps every employee understand that how they do their particular job contributes directly to Vue's business success. It also helps maintain a 'balanced' approach, and avoid attention to, say, sales, at the expense of quality.
 - 2 One of Vue's problems, however, is finding suitable external benchmarks – because it already outperforms its rivals. So it makes sense for the company to look at non-competitive benchmarking opportunities. This is likely to be 'practice' rather than 'performance' benchmarking. For example, looking at how fast-food outlets operate would be relevant to Vue's catering services. With respect to the film projection side of the business, theatres or other event venues may have something to offer. As for ticket sales, the yield management systems used by airlines might be an approach that Vue could adopt or adapt for its own purposes.
-

Session 26 summary

Sessions 25 and 26 have described all aspects of performance improvement. This session focussed on two radically different approaches to achieving performance improvement; namely breakthrough (i.e., radical) improvement, and incremental (i.e., continuous) improvement. The session closed by considering some specific improvement techniques. The next session summarises your study of operations management.

Now go to Session 27: Conclusion or take a break before continuing

Glossary

DMAIC cycle

Increasingly used improvement cycle model, popularized by the Six Sigma approach to operations improvement (Slack *et al.*, 2007, p. 700)

PDCA cycle

Stands for Plan, Do, Check, Act cycle, perhaps the best known of all improvement cycle models (Slack *et al.*, 2007, p. 703)

B203 Business functions in context

Session 27: Conclusion

Prepared by David Barnes and Matt Hinton

Session 27	152
Introduction to Session 27	152
Activity 27.1: Contemporary challenges in operations management	152
Activity 27.2: Management challenges at Oxfam	153
Activity 27.3: DVD activity – conclusion	155
Session 27 summary	155

Session 27

Introduction to Session 27

Previous: Session 26: Performance improvement 2

This, the final session of the block, is in two sections, each of which points in an opposing direction. The first two activities look ahead – to the future of operations management. The third activity directs you to the Block 2 conclusion on the DVD.

The session opens by looking to the future. The world of operations management has seen big changes in the past few decades, as western economies have developed from a primary focus on manufacturing to being based overwhelmingly on services; from industries where human labour dominated production processes to ones where human knowledge and innovation are critical to success. This part of the session examines some of the major challenges currently facing operations management. The future of operations management will depend on how organisations respond to these challenges. This part of the session is based on material in Slack *et al.* Chapter 21, pp. 678–97.

Activity 27.1: Contemporary challenges in operations management

Allow **90 minutes** for this activity.

In the final chapter of their book, Slack *et al.* identify five key challenges, discussing the impact of each on the future of operations management.

Task

Now go to Slack *et al.* Chapter 21, pp. 678–94. Start at the top of p. 678 and read to the bottom of p. 694.

Feedback

The five challenges identified by Slack *et al.* are:

1 *Globalisation*

Slack *et al.* emphasise the ethical challenges posed by globalisation. Without wishing to downplay the significance of this aspect of the globalisation challenge, you might consider that Slack *et al.*'s coverage significantly downplays the impact of globalisation on the more prosaic aspects of operations management. Globalisation involves the extension of an operation's supply chain across the whole world. As such the operations function will be dealing with supply chain partners (customers and other collaborators) to serve customers (both internal and external) in countries far away from the familiar landscape of the home country. This affects many aspects of operations management, some of which are captured in Table 21.1.

2 *Corporate social responsibility*

As organisations become global in scope – and maybe because of this – there seems to be an increased expectation among their stakeholders that they should behave in a socially responsible manner. As most organisational activity takes place within its operations function, its decisions and actions can have the biggest economic social and environmental impact. Table 21.2 tries to capture the area where operations management affects corporate social responsibility issues.

3 *Environmental protection*

Organisations have always had an environmental impact. However, this has accelerated in recent years as the scale of corporate activity has increased across the planet. At the same time, stakeholders' expectations about the need for organisations to minimise their impact on the environment have risen dramatically. It usually falls to the operations function to address these concerns. Table 21.3 summarises some of these environmental issues.

4 *Technology awareness*

Organisations have always sought to exploit the latest technology in their operations. However, the pace of technological change and the opportunities that this offers to operations seems unprecedented. Again, you may consider that Slack *et al.* somewhat downplay this issue, particularly with regard to information and communication technologies. Table 21.4 identifies some technology issues affecting operations management.

5 *Knowledge management*

As Slack *et al.* point out, knowledge management has become a popular concept in recent years. Its emergence as an area of study has enabled organisations to better understand the importance and impact of how they capture, create and apply knowledge to their operations. Table 21.5 links some knowledge management issues to the operations management decision areas.

Activity 27.2: Management challenges at Oxfam

Allow **20 minutes** for this activity

Task

Now go to the short case 'Oxfam' on p. 8 and answer the following question:

What are the main issues facing Oxfam's operations managers in terms of:

- globalisation
- corporate social responsibility
- environmental protection
- technology awareness
- knowledge management?

Feedback

- Globalisation: By definition, Oxfam's scope of operations is global. Anywhere a disaster strikes could receive the attention of the charity. However, much of Oxfam's work is not concerned with the high-profile disaster relief side of its business, but rather with the ongoing community development projects it undertakes. Most of these projects will be in the poorer, less developed parts of the world. The implication of this is that, from an operations point of view, services must be delivered without an assumed level of infrastructural support. The ability to adapt development methodologies to such circumstances would be a key operations task. Another aspect of globalisation for Oxfam concerns the coordination of expertise. Experts, either in development or in

disaster relief, may be located anywhere in the world. The task of understanding and coordinating this pool of potential help must be a major operations task. It will rely on maintaining a database of expertise and on the ability to deploy it, sometimes at short notice.

- **Corporate social responsibility:** This is one of those issues that is both an output from the operation and an objective for the way it runs its own operations. A key issue here must be the way in which the 'on the ground' managers of development projects tackle some of the particularly sensitive cultural issues. For example, gender issues are one of Oxfam's campaigning points; however, ideas about appropriate gender roles are very different in different parts of the world. Pursuing its own ends in terms of, say, girls' education, must be balanced against traditional ideas about the role of women. Whereas this difficulty may be relatively straightforward to reconcile at a strategic level back in the charity's Oxford headquarters, its successful resolution depends on how local operations managers deal with the issue at a day-to-day level.
- **Environmental protection:** To Oxfam, the concept of environmental protection must be tackled at two levels. The most obvious one is that environmental awareness is an 'output' from the charity's operations. In other words, environmental management, to some extent, is one of the operation's 'products'. It will engage in lobbying governments and non-governmental agencies to achieve its aims of greater environmental sustainability. However, there is also another, related, issue. Oxfam's operations themselves must also be environmentally sound. Agricultural projects, for example, must be managed to ensure that there is no inappropriate use of fertilisers and pesticides locally, even when there may be local pressures to do so.
- **Technology awareness:** Once again, this has elements of both output and process. Developing appropriate technologies for use in developing countries is both an output in terms of the charity wishing to influence technology usage, but also an issue which it must demonstrate itself. Also, although we are used to thinking of 'good' technology as being 'high' technology, in many cases 'good' technology for Oxfam means 'appropriate' technology. Thus developing technology that is sustainable, capable of being made and/or adapted locally and maintainable under normal conditions of use, is just as challenging a task as developing high-tech solutions to operations problems.
- **Knowledge management:** The work of charities such as Oxfam is extremely practical. It cannot rely on a theoretical knowledge base (although obviously it makes use of many branches of science and economics). The knowledge embedded within Oxfam's operations is the result of many years of attempting difficult tasks in very difficult conditions. It is vital for operations such as Oxfam that this knowledge is captured and deployed. Reinventing the wheel, or learning from scratch, on every project would be a waste of the charity's resources and a failure in its responsibility to the people it is trying to help. The capture and development of knowledge through manuals, databases and (even more important) discussions and on-the-job training must be a key issue for charities such as Oxfam.

(Source: Pearson, 2008)

Activity 27.3: DVD activity – conclusion

Allow **30 minutes** for this activity.

Task

Now go to the Conclusion to the DVD. (If necessary, you may want to remind yourself of the four cases in more detail, by watching the entire DVD again.) Using four case organisations shown on the DVD, explain, for the benefit of someone who is not studying B203, why operations management matters to organisations of all kinds.

You may like to save your notes to a [New note in MyStuff for Activity 27.3](#).

Feedback

Each of the organisations demonstrates in its own way the critical role that the operations function plays in ensuring overall organisational success. Take the case of bmibaby. It provides cheap no-frills flights for business and leisure travellers. Costs can be low only if the utilisation of the expensive assets, the aircraft, is maximised. This means careful operations design – a flight schedule that meshes medium-haul flights to Mediterranean destinations aimed at the leisure market with short-haul flights dominated by business travellers, that makes maximum use of crew flight hours, and that uses ground staff efficiently. Maximising utilisation of capacity also means filling planes. This depends on continuing to attract customers and retaining their future business – achieving high levels of punctuality is key, especially for the business traveller. Thus any failures in the organisation's operations have direct and damaging effects on both revenue and costs that in a competitive market could easily make the difference between organisational success and failure. Indeed the capabilities for operational excellence are a source of competitive advantage in an industry such as this, where operations can drive business strategy as well as being the means of delivering it.

There are similar cases to be made for the other organisations.

Session 27 summary

Session 27 examined some of the major challenges currently facing operations management and concluded that the future of operations management depends on how organisations respond to these challenges. The following block summary reviews the material that has been covered in this block and then summarises the key issues that have been addressed. Finally, it presents an overview of what you have learned.

Now go to Block 2 summary or take a break before continuing.

B203 Business functions in context

Block 2 summary

Prepared by David Barnes and Matt Hinton

Block 2	158
Block 2 summary	158
References	159
Acknowledgements	160

Block 2

Block 2 summary

Previous: Session 27: Conclusion

We have now reached the end of Block 2. In studying it, you have been introduced to the most important topics within the academic discipline of operations management.

The block's 21 study sessions were divided into five sections:

- *Section A* comprised four study sessions. These introduced you to the operations function and to the discipline of operations management. They also examined the strategic impact of operations management and the nature of operations strategy.
- *Section B* devoted four study sessions to the issue of design within operations. These considered the design of both processes and products, and explained some of the most important approaches and techniques used. The key decision of where to locate operations facilities was considered. Finally, the important issue of technology was examined.
- *Section C* examined the two interrelated activities that are at the very heart of operations management, namely planning and control. Five study sessions considered the nature of planning and control, capacity management strategies, inventory management, and the techniques and philosophy of lean operations.
- *Section D* devoted three study sessions to the supply chain perspective of operations. This seeks to place any individual operation into a wider context by considering its links both with the operations that supply its inputs and with those to whom it supplies its outputs.
- *Section E* considered the issues of quality and performance in operations management. It considered different approaches to managing quality. Some quality tools and techniques were examined, including the best-known approach to managing quality, namely TQM. Two sessions considered the challenges of measuring and improving performance, whilst the last session considered five of the most important contemporary challenges facing the operations functions.

You should by now understand that the operations function is the part of an organisation that is responsible for producing the goods and/or delivering the services required by its customers. The aim of the operations function is to satisfy customers while making the best use of resources at its disposal. Its activities lie at the heart of any organisation, as they involve the management of the vast majority of its resources. The operations function is typically responsible for managing most of an organisation's assets, employees and expenditure. The block has introduced you to the academic discipline of operations management, which is the study of the activities that are undertaken within the operations function. You should now appreciate that it is as important to study operations management as it is the other functional disciplines (marketing, accounting and finance, information management, and human resource management) covered in B203. I hope that you have also come to appreciate that operations management is vitally important to the success of any organisation, because no organisation can hope to be successful unless its operations are well managed.

Your work on Block 2 should have helped you to answer TMA 01. After you have completed work on Block 2 and TMA 01, proceed to the next block.

Now go to Block 3 introduction or take a break before continuing.

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Text

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