Fourth Edition

Operations Strategy

Nigel Slack
Michael Lewis

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Preface

Operations strategy is a major source of competitive advantage in for-profit businesses and the route to achieving social welfare in not-for-profit enterprises. No matter what sector, it can have a huge impact – not just in the short term, but also on an enduring basis. Just look at those companies that have transformed their prospects through the way they manage their operations resources strategically: Amazon, Apple, Dyson, Holcim, IKEA, Intel, Rolls Royce, Singapore Airlines, Tesco, ARM, Toyota, Wipro, Zara and many more, all have developed their strategic operations capabilities to the point where they represent a formidable asset. (And all are amongst the many examples to be found in this book.) These firms have found that it is the way they manage their operations, and their resources in general, that sets them apart from, and above, their competitors.

The dilemma is that when we talk about 'operations', we must include the majority of the firm's resources, because contributing to creating the firm's services and products is such an all-consuming task. And when something is all around us, like operations resources are, it can be difficult to see them in their entirety. This is the paradox of operations strategy. It lies at the heart of how organisations manage their strategic intent in practice and is vitally important for long-term success. Yet it is also so all-embracing that it becomes easy to underestimate the significance of the subject.

If you doubt the importance of the subject, the following are just some of the decisions with which operations strategy is concerned.

- How should the organisation satisfy the requirements of its customers?
- How should each function within the organisation satisfy the requirements of its *internal* customers?
- What intrinsic capabilities should the organisation try and develop as the foundation for its long-term success?
- How specialised should the organisation's activities become?
- Should the organisation sacrifice some of its objectives in order to excel at others?
- How big should the organisation be?
- Where should the organisation locate its resources?
- When should it expand or contract, and by how much?
- What should it do itself and what should it contract out to other businesses?
- How should it develop relationships with other organisations?
- What type of technology should it invest in?
- How should it organise the way it develops new products and services?
- How should it bind together its resources into an organisational structure?
- How should the organisation's resources and processes be improved and developed over time?
- What guiding principles should shape the way any organisation formulates its operations strategies?

All these questions are not merely important – they are fundamental. No organisation, whether large or small, for-profit or not-for-profit, in the services or manufacturing sector, international or local, can ignore such questions. Operations strategy is central, ubiquitous and vital to any organisation's sustained success.

New to this edition

The success of the previous three editions was helped by the many suggestions we received from fellow teachers and students of operations strategy. They have been kind enough to provide further feedback that has informed the changes we have made for the fourth edition. These changes include the following:

- An approach that highlights some of the developments in operations strategy, especially how its concepts are having wider application.
- Many new and updated examples, which cover the topical issues in operations strategy. Two thirds of the examples used are new or updated for this edition.
- The inclusion of some new material relating to such issues as the links between operations management and strategy, triadic supply relationships, knowledge management and organisational ambidexterity.
- Introducing some new longer cases, but retaining those that proved popular from the previous edition. These cases can still be used to form the basis of a whole course in operations strategy.

The aim of this book

The aim of this book is to provide a treatment of operations strategy that is clear, well-structured and interesting. It seeks to apply some of the ideas of operations strategy to a variety of businesses and organisations. The text provides a logical path through the key activities and decisions of operations strategy, as well as covering the broad principles that underpin the subject and the way in which operations strategies are put together in practice.

More specifically, the text aims to be:

- Balanced in its treatment of the subject. In addition to taking the orthodox 'market-led' approach to operations strategy, the book also provides an alternative but complementary 'resource-based' perspective.
- Conceptual in the way it treats the decisions, activities and processes that together form an organisation's operations strategy. Although some examples are quantified, the overall treatment in the book is managerial and practical.
- Comprehensive in its coverage of the more important ideas and issues, which are relevant to most types of business. In any book covering such a broad area as operations strategy, one cannot cover everything. However, we believe that the more important issues are all addressed.
- Grounded in the various bodies of knowledge that underpin operations strategy. Theory is included in most chapters, which introduces concepts and principles, often from other academic disciplines, and which illuminates the particular operations strategy issue being discussed.

- International in the examples it uses to describe practical operations strategy issues.

Who should use this book?

This book is intended to provide a broad introduction to operations strategy for all students who wish to understand the strategic importance and scope of the operations function. For example:

- MBA students, who should find that it both links and integrates their experience and study of operations management with their core studies in business strategy.
- Higher-level undergraduates studying business or technical subjects, although we assume a prior knowledge of the basics of operations management.
- Postgraduate students on other specialised Masters degrees, who should find that it provides them with a well-grounded approach to the subject.
- Executives, who will also be able to relate the practical and pragmatic structure of the book to the more conceptual and theoretical issues discussed within the structure.

Distinctive features

Clear structure

The book employs coherent models of the subject that run through each part of the text and explain how the chapters fit into the overall subject. Key questions set the scene at the beginning of each chapter and also provide a structure for the summary at the end of each chapter.

Illustration-based

The study of operations, even at a strategic level, is essentially a practical subject and cannot be taught in a purely theoretical manner. Because of this we have used both abstracted examples and 'boxed' examples, which explain some issues faced by real operations.

Theory

Operations strategy is a practical subject that is driven by theoretical ideas. Most chapters contain one or more theories that explain the underpinning ideas that have contributed to our understanding of the issues being discussed.

Case studies

The book includes a number of case studies suitable for class discussion. The cases are long enough to provide depth and serve as illustrations, which can be used to supplement class sessions.

Selected further reading

Every chapter ends with a list of further reading, which takes the topic covered in the chapter further or treats some important related issues.

Website

A website is available that helps students to develop a firm understanding of each issue covered in the book and provides lecturers with pedagogical assistance. There is also a teacher's manual available.

Chapters

Chapter 1 defines operations strategy in terms of the reconciliation between market requirements and operations resources.

Chapter 2 looks at three interrelated issues that affect reconciliation – how operations change over time, how operations deal with trade-offs and how trade-offs can be used to understand 'targeted', or focused, operations.

Chapter 3 examines some of the popular approaches to improving operations performance. These are total quality management (TQM), lean operations, business process reengineering (BPR) and Six Sigma. Although they are not strategies as such, implementing any of them is a strategic decision.

Chapter 4 examines those decisions that shape the overall capacity of the operations resources, particularly the level of capacity and where the capacity should be located, and deals with the dynamics of the capacity decision by examining how capacity is changed over time.

Chapter 5 looks at supply networks – in particular, the nature of the relationships that develop between the various operations in a network, the advantages of taking a total network perspective and how networks behave in a dynamic sense.

Chapter 6 characterises the various types of process technology that are at the heart of many operations; it looks at the effects of some newer types of technology on operations capabilities and proposes some ideas that help operations to choose between different technologies and implement them once chosen.

Chapter 7 examines the way operations resources can be developed and improved within the organisation, especially how capabilities can be directed, developed and deployed in a cycle of improvement.

Chapter 8 applies some of the issues covered in the previous chapters to the activities associated with product and service development and organisation.

Chapter 9 is concerned with 'how' to reconcile market requirements with operations resources over the long term. In particular it looks at the first two of the four stages of the process of operations strategy, namely formulation and implementation.

Chapter 10 looks at the final two stages of the four stages of the process of operations strategy, namely monitoring and control.

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Nigel Slack
Michael Lewis

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Figures

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Tables

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Text

Case Study 3 from Verweire, K. and Buekens, W., 17/03/2014, Vlerick Business School, http://www.vlerick.com/en/research-and-faculty/knowledge-items/knowledge/carglass-building-and-sustaining-a-customer-centric-organisation; Case Study 4 from Micheli, P. and Beer, H., Warwick Business School, University of Warwick, http://www.wbs.ac.uk/; Case Study 5 from Ocado Versus Tesco, *IMD*, 3-0323 (Keller-Birrer, V. and Tsikriktsis, N.), © 2010 by IMD International Institute for Management Development, Lausanne, Switzerland. Not to be used or reproduced without prior written permission directly from IMD; Case Study 9 from *IDEO: Service Design (A)*, 606-012-1 (2008), this case was written by Ritesh Bhavnani, Research Associate and INSEAD

MBA (July 2004), and Manuel Sosa, Assistant Professor of Technology and Operations Management at INSEAD, as basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. The information in this case has been obtained from both public sources and company interviews. © 2006 INSEAD; Example on pp. 288–9 with permission from Toyota (GB) PLC, solely for education purposes.

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CHAPTER

1

Operations strategy – developing resources and processes for strategic impact

Introduction

For some business managers, the very idea of an 'operations strategy' is a contradiction in terms. After all, to be involved in the strategy process is the complete opposite of those detailed and day-to-day tasks and activities that are associated with being an operations manager. Yet at the same time we know that operations can have a real strategic impact. For many *enduringly* remarkable enterprises, from Amazon to IKEA and from Apple to Zara, the way they manage their operations resources and processes is central to long-term strategic success. This is why it is the prime purpose of this book to demonstrate how managing operations strategically can make all types of firm better, or different, or both, from their competitors. But just as revealing is that when companies do stumble, it is often because they have either taken their eye off the operations ball, or failed to appreciate its importance in the first place. More generally, all enterprises, *and all parts of the enterprise*, need to prevent strategic decisions being frustrated by poor operational implementation. And this idea leads us to the second purpose of this book. It is to show that the principles of operations strategy can be deployed in *all* parts of the business, *all* functions of the business, and *all* its extended supply network – and that, by using these principles, any type of enterprise will benefit. This is the first chapter of the book, and we look at both these meanings of operations strategy and how all parts of the business can use four perspectives on operations strategy to establish a connection between strategy and operational process and resources.

KEY QUESTIONS

- *Why is operations excellence fundamental to strategic success?*
- *What is strategy?*
- *What is operations strategy and how is it different from operations management?*
- *How should operations strategy reflect overall strategy?*
- *How can operations strategy learn from operational experience?*
- *How do the requirements of the market influence operations strategy?*
- *How can the intrinsic capabilities of an operation's resources influence operations strategy?*
- *What is the 'content' of operations strategy?*
- *What is the 'process' of operations strategy?*
- *How is operations strategy developing?*

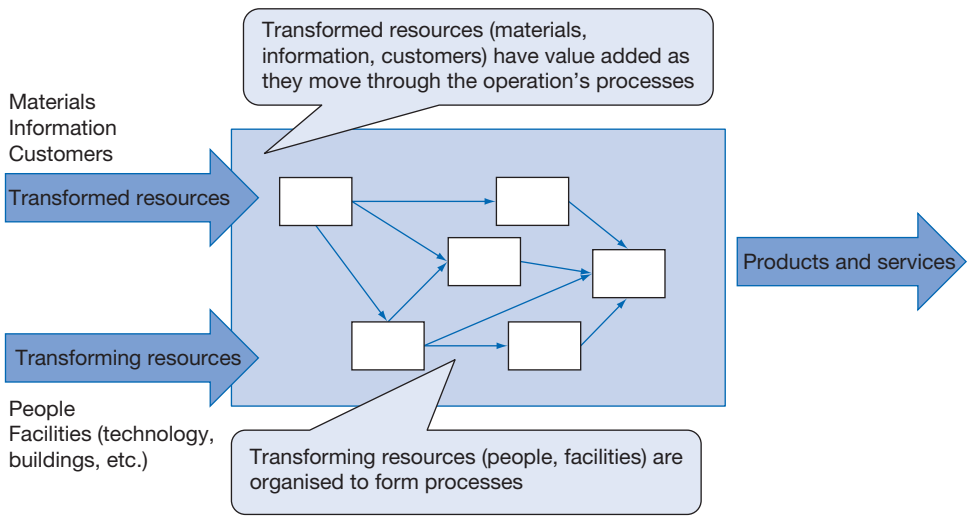
Why is operations excellence fundamental to strategic success?

'Operations' is the part of the organisation that creates and/or delivers its products and services. Every organisation, whether a hotel, hospital consultancy, supermarket, games developer, government department, in fact any type of organisation, has an operations function, even if it is not called that.[1] This is because every organisation tries to add value by producing some mix of products and services for external or internal customers. It does so by transforming inputs into outputs that satisfy some customer need. This idea is called the 'input-transformation-output' model of operations. Some inputs are actually changed or 'transformed' (usually some combination of physical materials, information and customers). So, predominantly, a television factory processes materials, a firm of accountants processes information, while a theatre processes customers. Other resource inputs do the transforming. These are usually classified into the physical facilities (buildings, machines, equipment, computers, etc.) and the people, with their skills, knowledge and experience. Transforming resources are allocated to various activities in various parts of the operation. Transformed resources move through these activities until they are transformed into some mix of products and services. The arrangement of transforming resources and the way in which transformed resources move through them, are called 'processes' (see Figure 1.1). So operations managers are responsible for managing two interacting sets of issues:

- Resources – what type of materials, information, people (as customers or staff), technology, buildings and so on, are appropriate to best fulfil the organisation's objectives.
- Processes – how resources are organised to best create the required mix of products and services.

Or, to put it more succinctly, do we have the right resources and are we using them appropriately?

Figure 1.1 All operations transform input resources into products and services



Note that most operations produce both products *and* services. But some, such as an aluminium smelter, mainly produce products with only a peripheral service element. Others, such as a psychotherapy clinic, produce almost pure services. Yet the idea of the transformation model applies to all types of operation, manufacturing and service, for-profit and not-for-profit, those with external customers and those with internal customers. Hotels produce accommodation services, financial services invest, store, move or sell us money and investment opportunities, and manufacturing businesses physically change the shape and the nature of materials to produce products. Although these businesses are from different sectors (hospitality, banking, manufacturing, etc.), they share a very similar set of issues and problems. In fact, there are often bigger differences *within* economic sectors than *between* them. Note also that the transformation model describes functions other than the operations function. Marketing, finance, information systems and HRM all transform inputs into outputs (usually services) to satisfy customer needs. Sometimes these customers are external, sometimes internal. But the principle holds true: all parts of the business and all functions of the business are, in a sense, 'operations'.

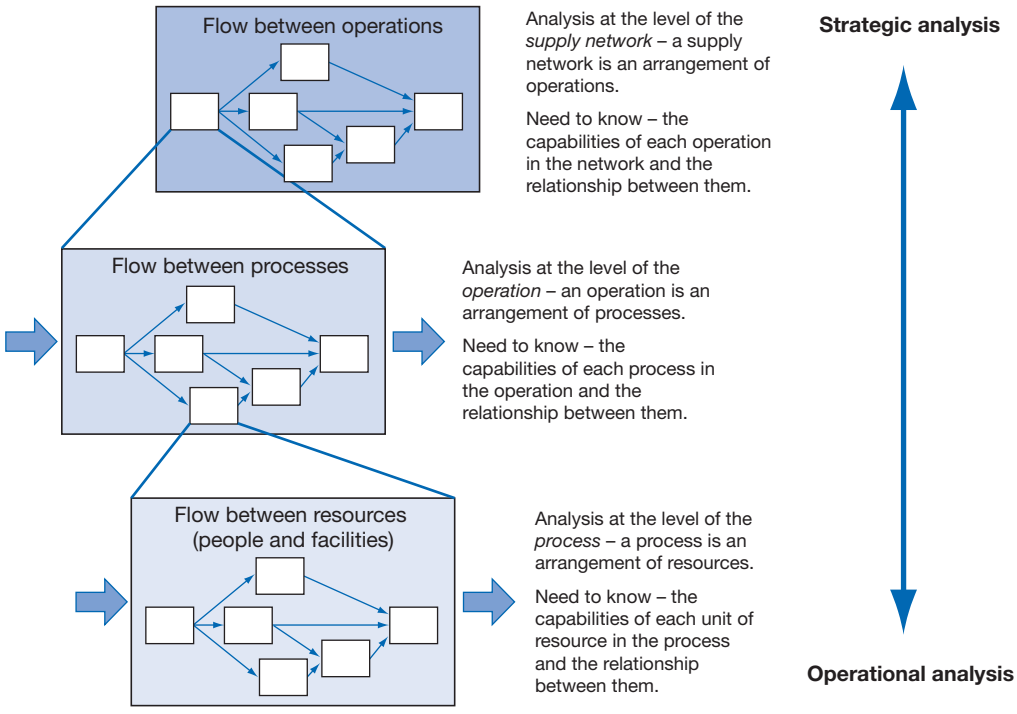
Operations, networks and 'levels of analysis'

In Figure 1.1 we illustrated 'processes' within a transformation system as a network of transforming resources. By a 'network' we simply mean a group of two or more sets of resources linked together.

The idea of the network is fundamental to operations because *all* operations are formed of networks: networks of individual staff with their technology (computers, for example), through which information flows; networks of work centres or departments moving physical products between them; and networks of businesses trading a complex mix of services. Networks can describe operations activity of many different types at many different levels of analysis. At a detailed micro level, networks of individual units of resource (technology and people) form processes. At a slightly higher 'level of analysis', these processes themselves are linked together to form larger organisational units that, again, are the elements of what is generally called 'the operation'. And many processes in this internal network will be in the other functions of the business. Thus, sales, marketing, HRM, finance and all the other functions' processes will form part of (and hopefully be integrated with) this internal process network. At an even higher level of analysis, any operation can also be viewed as part of a greater network of operations. It will have operations that supply it with the input products and services it needs to make its own products and services. And unless it deals directly with the end consumer, it will supply customers who themselves may go on to supply their own customers. Moreover, any operation could have several suppliers, several customers and may be in competition with other operations producing similar services to those it produces itself. This collection of operations is called the 'supply network'.

The important point here is that at each level of analysis, operations managers must understand the capabilities of the resources that form each element of their network, and how effectively they are linked together as networks. This idea is illustrated in Figure 1.2, which shows three levels of analysis: the level of the process (a network of individual units of resource), the level of the 'operation' (a network of processes) and the level of the supply network (a network of operations). This idea is called the 'hierarchy of operations'. In the study of operations strategy we shall largely (but not exclusively) focus on the higher levels of analysis.

Figure 1.2 The hierarchy of operations describes networks at different levels of analysis. Three are illustrated here: the supply network, the operation and the process



All operations are not the same

All operations and processes differ in some way and so will need managing differently. Some differences are 'technical' in the sense that different products and services require different skills and technologies to produce them. However, processes also differ in terms of the nature of demand for their products or services. Four characteristics of demand, sometimes called the 'Four Vs', have a significant effect on how processes need to be managed:

1 **Volume** – A high volume of output means a high degree of repeatability, making a high degree of specialisation both feasible and economic. This allows the systemisation of activities and specialised technology that gives higher processing efficiencies. By contrast, low-volume processes with less repetition cannot specialise to the same degree. Staff perform a wider range of tasks that are less open to systemisation. Nor is it likely that efficient, high-throughput technology could be used. The implication of this is that high volume results in lower unit costs than low volume. So, for example, the volume and standardisation of large fast-food restaurant chains, such as McDonald's or KFC, enables them to produce with greater efficiency than a small, local cafeteria or diner.

2 **Variety** – Producing a high variety of products and services must involve a wide range of different activities, changing relatively frequently between each activity. It must also contain a wide range of skills and technology that is sufficiently 'general purpose' to cope with the range of activities and sufficiently flexible to change between them. High variety may also imply a relatively wide range of inputs and the additional complexity of matching customer requirements to appropriate products or services. Thus, high variety generally means higher costs than low variety. For example, a taxi company is usually prepared to pick up and drive customers almost anywhere (at a price). There are an infinite number of potential routes (products) that it offers. But, its cost per kilometre travelled will be higher than a less customised form of transport, such as a bus service.

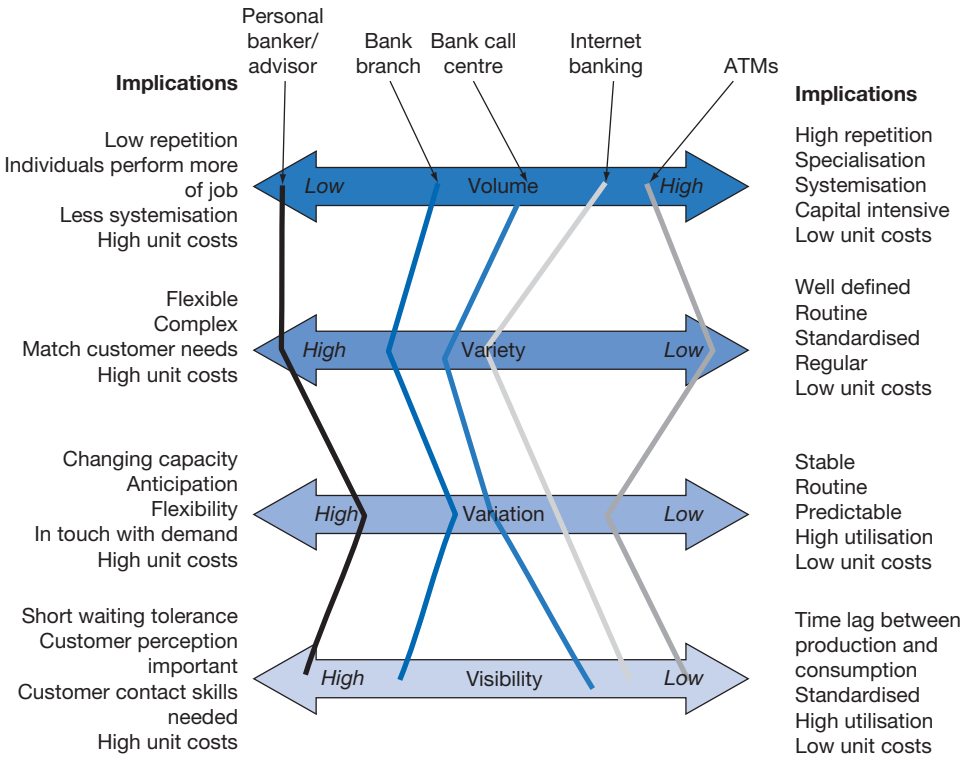
3 **Variation** – Processes are generally easier to manage when they only have to cope with predictably constant demand. Resources can be geared to a level that is just capable of meeting demand. All activities can be planned in advance. By contrast, when demand is variable and/or unpredictable, resources will have to be adjusted over time. Worse still, when demand is unpredictable, extra resources will have to be designed into the process to provide a 'capacity cushion' that can absorb unexpected demand. For example, manufacturers of high-fashion garments have to cope with both seasonality and the uncertainty of whether particular styles may prove popular. Producing conventional business suits, by contrast, will be both less seasonal and more predictable. Because processes with lower variation do not need any extra safety capacity and can be planned in advance, they will generally have lower costs than those with higher variation.

4 **Visibility** – Process visibility is a slightly more difficult concept to envisage. It indicates how much of the value added by the operation is 'experienced' directly by customers, or how much it is 'exposed' to its customers. Generally, processes that act directly on customers (such as retail processes or health care processes) will have higher visibility than those that act on materials and information. However, even material- and information-transforming processes may provide a degree of visibility to the customers. For example, parcel distribution operations provide internet-based 'track and trace' facilities to enable their customers to have visibility of where their packages are at any time. In low-visibility operations the time lag between customer request and response could be measured in days rather than the near-immediate response expected from high-visibility ones. This lag allows the activities to be performed when it is convenient to the operation, thus achieving higher utilisation. Also, staff in high-visibility operations will need customer-contact skills. For all these reasons, high visibility tends to result in higher costs than low visibility.

The implications of the Four Vs of processes

The importance of the Four Vs is that they are the result of strategic decisions that have been taken by an operation. The types of products and services it chooses to develop, and the type of markets that it chooses to enter, will define the volume, variety, variation and visibility with which the operation has to cope. At the same time, all four Vs will affect the way that the operation's processes are managed. The Four Vs act as a link between the strategic and operational aspects of operations management. The most obvious implication of an operation's positioning on the Four Vs is on processing costs. Put simply, high volume, low variety, low variation and

Figure 1.3 The Four Vs analysis for some retail banking services



low visibility all help to keep processing costs down. Conversely, low volume, high variety, high variation and high customer contact generally carry some kind of cost penalty for the process. This is why the volume dimension is often drawn with its 'low' end at the left, unlike the other dimensions, to keep all the 'low cost' implications on the right. Figure 1.3 summarises the implications of such positioning and illustrates the different positions on the Four Vs for some retail banking processes. Note that the personal banking/advice service is positioned at the high-cost end of the Four Vs, which is why it is generally offered to customers that represent high profit opportunities. Other, more automated services, such as ATMs and internet banking, have far lower costs.

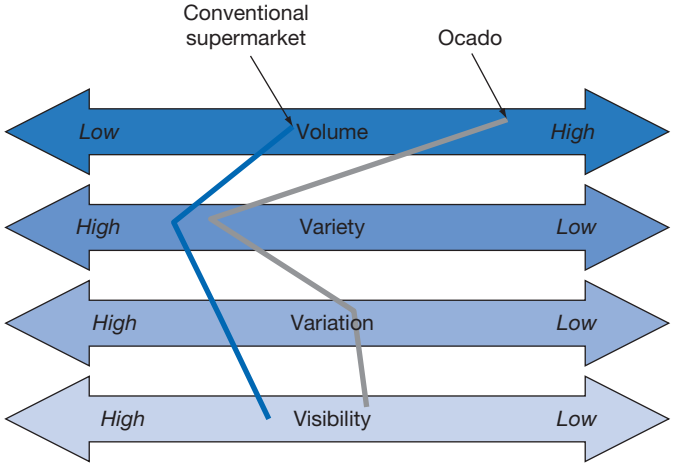
Example Online versus supermarket grocery retailing[2]

The retail industry is huge; we all shop – some more than others. For example, in the UK, wholesale and retail activity contributes almost 12 per cent of total Gross Value Added, and this is typical of developed economies. The retail industry, however, has been

changing. In particular, more shopping takes place online. But for a time there was one exception – groceries. It is the biggest category in retailing but has been relatively impervious to the encroachment of online shopping. There are good reasons for this. First, established retailers worry that online shopping will simply reduce sales at their shops without reducing the costs of doing business. Second, many grocery items have relatively low value (and profit margins). Third, different items need to be stored at different temperatures. Fourth, delivery costs can be expensive – usually more than customers are willing to pay. Finally, many customers want to inspect fresh produce before they buy it. In addition, the early history of online grocery retailing was not encouraging. One of the first, California's Webvan, expanded fast but collapsed when its revenues could not match its costs.

In the UK, online grocery sales have made more of an impact than most of the world, partly because it is a small, relatively populous country. One of its largest online grocers is Ocado, which has built large, super-efficient warehouses (which require considerable investment). But the advantage of large 'fulfilment centres' such as Ocado's can be understood by looking at its Four Vs (see Figure 1.4 below). Each fulfilment centre serves a large geographic area that has a high volume of demand. Although it confines itself to grocery items, unlike some larger supermarkets that stock hardware and larger items, its variety is still relatively wide. Again, because of its scale, the variation in demand will be proportionally less than a conventional supermarket. Finally, the picking and packing is done centrally away from the customer, who will only have 'visibility' of Ocado though the website and at the time of delivery. Notice how the Ocado-style operation is positioned on the Four Vs towards the lower-cost end compared to a conventional supermarket. The question for online grocery retailers is whether these operational efficiencies will pay for the extra costs of delivery and the investment in fulfilment centres.

Figure 1.4 **The Four Vs analysis for a conventional supermarket and for Ocado**



What is strategy?

We have used the word 'strategy' several times. But what exactly is strategy? Surprisingly, it is not easy to answer what seems like a straightforward question. Linguistically, the word derives from the Greek word *strategos*, meaning 'leading an army'. And although there is no direct historical link between Greek military practice and modern ideas of strategy, the military metaphor is powerful. Both military and business strategy can be described in similar ways, and include some of the following.

- Setting broad objectives that direct an enterprise towards its overall goal.
- Planning the path (in general rather than specific terms) that will achieve these goals.
- Stressing long-term rather than short-term objectives.
- Dealing with the total picture rather than stressing individual activities.
- Being detached from, and above, the confusion and distractions of day-to-day activities.

Later views of strategy have introduced some of the practical realities of business, based on observations of how organisations really do go about making (or not making) strategic decisions. These include the following.

- Business objectives may not ever become 'clear'. In fact, most organisations will have multiple objectives that may themselves conflict. For example, an outsourcing decision may improve profitability but could involve a firm in long-term reputational risk.
- Markets are intrinsically unstable in the long term, so there must be some limit to the usefulness of regarding strategy as simply planning what to do in the future. It may be more important to keep close to what is actually happening in the market and adapt to whatever circumstances develop.
- Many decisions are far less formal than the simple planning model assumes. In fact, many strategic decisions 'emerge' over time rather than derive from any single, formal senior management decision.
- Organisations do not always do in practice what they say they'll do, or even what they want to do. The only way to deduce the effect strategy of an organisation is to observe the pattern of decisions that it makes over time.

In this book we recognise the problematic nature of strategy. Nevertheless, we do offer some models and approaches that implicitly assume that managers can have some influence over the strategic direction of their organisation – even if this influence may, at times, be limited. So, notwithstanding the uncertainties and complexities of real strategy making, it is our belief that some kind of structure, model or plan can help most managers to understand what they believe they should be doing. Also note that, although strategy is described here as being an 'enterprise-level' issue, almost everything that is contained in the previous discussion can also apply to an individual function or subset of an enterprise. This is an area we shall develop later.

Example **Sometimes any plan is better than no plan**

There is a famous story that illustrates the importance of having some kind of plan, even if hindsight proves it to be the wrong plan.[3] During manoeuvres in the Alps, a detachment of Hungarian soldiers got lost. The weather was severe and the snow was deep. In these freezing conditions, after two days of wandering, the soldiers gave up hope and became reconciled to a frozen death on the mountains. Then, to their delight, one of the soldiers discovered a map in his pocket. Much cheered by this discovery, the soldiers were able to escape from the mountains. When they were safe back at their headquarters, they discovered that the map was not of the Alps at all, but of the Pyrenees. The moral of the story? A plan (or a map) may not be perfect but it gives a sense of purpose and a sense of direction. If the soldiers had waited for the right map they would have frozen to death. Yet their renewed confidence motivated them to get up and create opportunities.

What is operations strategy and how is it different from operations management?

One of the biggest mistakes a business can make is to confuse 'operations' with 'operational'. The meaning of 'operational' is the opposite of strategic; it means detailed, localised, short term and day to day. And operations *management* is very much like this. Yet 'managing the resources and processes that produce and deliver goods and services' should also be seen as a long-term and strategic issue. More importantly, it should be seen as one that can have a significant strategic impact. So, in answer to the question 'What is the difference between operations strategy and operations management?', at a superficial level, the answer is: 'It's a strategic perspective on how operations resources and processes are managed'. Yet this overlooks some important implications.

- **Operations strategy is longer term**. Operations management is largely concerned with short to medium time-scales while operations strategy is concerned with more long-term issues.
- **Operations strategy is concerned with a higher level of analysis**. Operations management is largely concerned with managing resources within and between smaller operations (departments, work units, etc.) whereas operations strategy is more concerned with decisions affecting a wider set of the organisation's resources and the supply network of which they are a part.
- **Operations strategy involves a greater level of aggregation**. Operations management is concerned with the details of how products and services are produced. Individual sets of resources are treated separately, as the component parts of the operation. Operations strategy, on the other hand, brings together and consolidates such details into broader issues.
- **Operations strategy uses a higher level of abstraction**. Operations management is concerned largely with what is immediately recognisable and tangible. Operations strategy often deals with more abstract, less directly observable, issues.

See Table 1.1 for some examples of operations management and operations strategy questions.