FIFTH EDITION

Operations Strategy

Nigel Slack
Michael Lewis
Mohita Gangwar Sharma

Pearson

About Pearson

Pearson is the world's learning company, with presence across 70 countries worldwide. Our unique insights and world-class expertise comes from a long history of working closely with renowned teachers, authors and thought leaders, as a result of which, we have emerged as the preferred choice for millions of teachers and learners across the world.

We believe learning opens up opportunities, creates fulfilling careers and hence better lives. We hence collaborate with the best of minds to deliver you class-leading products, spread across the Higher Education and K12 spectrum.

Superior learning experience and improved outcomes are at the heart of everything we do. This product is the result of one such effort.

Your feedback plays a critical role in the evolution of our products and you can contact us at reachus@pearson.com. We look forward to it.

This page is intentionally left blank.

OPERATIONS STRATEGY

OPERATIONS STRATEGY

Fifth Edition

Nigel Slack

Michael Lewis

Adapted by:

Mohita Gangwar Sharma

Pearson

Authorized adaptation from the United States edition, entitled Operations Strategy, 5th Edition, ISBN 9781292162492 by Slack, Nigel and Lewis, Michael, published by Pearson Education, Inc, Copyright © 2017.

ISBN 978-93-530-6045-9
eISBN 9789353062545

First Impression

This edition is manufactured in India and is authorized for sale only in India, Bangladesh, Bhutan, Pakistan, Nepal, Sri Lanka and the Maldives. Circulation of this edition outside of these territories is UNAUTHORIZED.

Published by Pearson India Education Services Pvt. Ltd, CIN: U72200TN2005PTC057128.

Head Office: 15th Floor, Tower-B, World Trade Tower, Plot No. 1, Block-C, Sector-16, Noida 201 301, Uttar Pradesh, India.
Registered Office: 4th Floor, Software Block, Elnet Software City, TS-140, Block 2 & 9, Rajiv Gandhi Salai, Taramani, Chennai 600 113, Tamil Nadu, India.
Fax: 080-30461003, Phone: 080-30461060
Website: in.pearson.com, Email: companysecretary.india@pearson.com

Printer in India at

Brief Contents

List of Figures, Tables and Exhibits from Case Studies xiii
Preface xxi
Acknowledgements xxv
Preface to the Indian Edition xxvi
About the Authors xxvii
Publisher's Acknowledgements xxviii

1 Operations strategy – developing resources and processes for strategic impact 1

2 Operations performance 45

3 Substitutes for strategy 91

4 Capacity strategy 121

5 Purchasing and supply strategy 154

6 Process technology strategy 196

7 Improvement strategy 233

8 Product and service development and organisation 272

9 The process of operations strategy – formulation and implementation 309

10 The process of operations strategy – monitoring and control 341

Case studies 369
Index 463

This page is intentionally left blank.

Contents

List of Figures, Tables and Exhibits from Case Studies xiii
Preface xxi
Acknowledgements xxv
Preface to the Indian Edition xxvi
About the Authors xxvii
Publisher's Acknowledgements xxviii

Chapter 1 Operations strategy – developing resources and processes for strategic impact 1

Introduction 1
Why is operations excellence fundamental to strategic success? 2
What is strategy? 7
What is operations strategy and how is it different from operations management? 9
What is the 'content' of operations strategy? 25
The operations strategy matrix 32
What is the 'process' of operations strategy? 33
How is operations strategy developing? 36
Summary answers to key questions 41
Further reading 43
Notes on the chapter 43

Chapter 2 Operations performance 45

Introduction 45
Operations performance can make or break any organisation 46
Judging operations performance at a societal level? 48
Judging operations performance at a strategic level 53
Judging operations performance at an operational level? 56
The relative importance of performance objectives changes over time 68
Trade-offs – are they inevitable? 72
Targeting and operations focus 80
Summary answers to key questions 87
Further reading 89
Notes on the chapter 89

Chapter 3 Substitutes for strategy 91

Introduction 91
Fads, fashion and the 'new' approaches to operations 92
Total quality management (TQM) 93
Lean operations 99
Business process reengineering (BPR) 105

Six Sigma 109
Some common threads 115
Summary answers to key questions 119
Further reading 120

Chapter 4 Capacity strategy 121

Introduction 121
What is capacity strategy? 122
The overall level of operations capacity 122
The number and size of sites 133
Capacity change 135
Location of capacity 142
Summary answers to key questions 151
Further reading 152
Notes on the chapter 152

Chapter 5 Purchasing and supply strategy 154

Introduction 154
What is purchasing and supply strategy? 154
Do or buy? The vertical integration decision 166
Contracting and relationships 172
Which type of arrangement? 181
Supply network dynamics 182
Managing suppliers over time 187
Purchasing and supply chain risk 190
Summary answers to key questions 192
Further reading 194
Notes on the chapter 194

Chapter 6 Process technology strategy 196

Introduction 196
What is process technology strategy? 197
Process technology should reflect volume and variety 202
The product–process matrix 208
The challenges of information technology (IT) 213
Evaluating process technology 217
Summary answers to key questions 230
Further reading 231
Notes on the chapter 232

Chapter 7 Improvement strategy 233

Introduction 233
Operations improvement 233
Setting the direction 240
Importance–performance mapping 246
Developing operations capabilities 251

Deploying capabilities in the market 263
Summary answers to key questions 268
Further reading 270
Notes on the chapter 270

Chapter 8 Product and service development and organisation 272

Introduction 272
Innovation, design and creativity 273
The strategic importance of product and service development 277
Product and service development as a process 284
A market requirements' perspective on product and service development 293
An operations resources perspective on product and service development 298
Summary answers to key questions 306
Further reading 307
Notes on the chapter 308

Chapter 9 The process of operations strategy – formulation and implementation 309

Introduction 309
Formulating operations strategy 310
What is the role of alignment? 310
Maintaining alignment over time 314
What analysis is needed for formulation? 320
The challenges to operations strategy formulation 323
How do we know when the formulation process is complete? 324
What is operations strategy implementation? 326
Summary answers to key questions 338
Further reading 339
Notes on the chapter 340

Chapter 10 The process of operations strategy – monitoring and control 341

Introduction 341
What are the differences between operational and strategic monitoring and control? 342
How is progress towards strategic objectives tracked? 345
How can the monitoring and control process attempt to control risks? 351
How does learning contribute to strategic control? 358
Summary answers to key questions 366
Further reading 367
Notes on the chapter 368

Case studies

Aarens Electronic 369
Aztec Component Supplies 373
Adani Agri Logistics Limited: Blocking the Grain Drain 375

Clever Consulting 387
Delta Synthetic Fibres (DSF) 389
Developing 'Savory Rosti-crisps' at Dreddo Dan's 395
Disneyland Resort Paris 399
Dresding Medical 406
Hagen Style 408
GreenDust: Revolutionizing the Returns Process 410
McDonald's: Half a Century of Growth 421
Ontario Facilities Equity Management (OFEM) 427
Operations Strategy at Galanz 431
Slagelse Industrial Services (SIS) 446
The Thought Space partnership 449
Turnround at the Preston Plant 452
Zara's Operating Model 456
Zentrill 461

Index 463

List of Figures, Tables and Exhibits from Case Studies

Figures

Figure 1.1	All operations transform input resources into products and services	2
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	4
Figure 1.3	The Four Vs analysis for some retail banking services	6
Figure 1.4	The Four Vs analysis for a conventional supermarket and Ocado	7
Figure 1.5	Four perspectives on operations strategy – top-down, bottom-up, market requirements and operations resources	11
Figure 1.6	Top-down and bottom-up perspectives of strategy for the metrology company	13
Figure 1.7	The 'market requirements' and 'operations resource' analysis of the lighting company	15
Figure 1.8	The four features of the VRIO framework	21
Figure 1.9	The content of operations strategy reconciles the market requirements and operations resource perspectives; the process of operations strategy reconciles the top-down and bottom-up perspectives	25
Figure 1.10	Operations strategy is the strategic reconciliation of market requirements with operations resources	26
Figure 1.11	Decomposing the ratio profit/total assets to derive the four strategic decision areas of operations strategy	29
Figure 1.12	The operations strategy matrix	32
Figure 1.13	Operations strategy matrix for Akshaya Patra	34
Figure 1.14	The stages of the process of operations strategy	35
Figure 1.15	The relationship between the concepts of 'the business model' and the 'operating model'	40
Figure 2.1	This chapter looks at how the relative importance of the market requirements and operations resource perspectives change over time, how performance objectives trade off between each other, and how operations focus can lead to exceptional performance	45
Figure 2.2	Three levels of operations performance	48

Figure 2.3	Broad objectives for a parcel delivery operation applied to stakeholder groups	49
Figure 2.4	Significant times for the delivery of two products/services	58
Figure 2.5	Different product groups require different performance objectives	64
Figure 2.6	Polar diagrams for newspaper collection (NC) and general recycling (GR) services and a proposed police performance method	64
Figure 2.7	Qualifiers, order-winners and delights expressed in terms of their competitive benefit with achieved performance Note. There is an erosion of delights and order winners over time	65
Figure 2.8	What is the operation doing today to develop the capabilities which will provide the 'Delights' of the future?	67
Figure 2.9	The effects of the product/service life cycle on operations performance objectives	68
Figure 2.10	Market requirements, operations resources and strategic reconciliation at VW over 70 years	73
Figure 2.11	The efficient frontier	77
Figure 2.12	To what extent do ethical and financial performance trade-off?	78
Figure 2.13	Burning bridges behind you increases commitment but reduces flexibility	85
Figure 3.1	This chapter concerns how some organisations use 'approaches' to operations improvement as substitutes for strategy	91
Figure 3.2	EFQM excellence model	98
Figure 3.3	TQM elements in the four operations strategy decision categories	99
Figure 3.4	(a) Traditional and (b) lean synchronised flow between stages	100
Figure 3.5	Lean elements in the four operations strategy decision categories	104
Figure 3.6	BPR advocates reorganizing (reengineering) processes to reflect the natural 'end-to-end' processes that fulfill customer needs	107
Figure 3.7	BPR elements in the four operations strategy decision categories	109
Figure 3.8	The DMAIC cycle of define, measure, analyse, improve and control	111
Figure 3.9	Six Sigma elements in the four operations strategy decision categories	114
Figure 3.10	Each of the 'new approaches' positioned in terms of their emphasis on what changes to make or how to make the changes, and whether they emphasise rapid or gradual change	117

Figure 4.1	This chapter looks at capacity strategy	121
Figure 4.2	Some factors influencing the overall level of capacity	124
Figure 4.3	Cost, volume and profit illustration	128
Figure 4.4	Unit cost curves	128
Figure 4.5	Expanding physical capacity in advance of effective capacity can bring greater returns in the longer term	132
Figure 4.6	Some factors influencing the number and size of sites	133
Figure 4.7	Some factors influencing the timing of capacity change	136
Figure 4.8	(a) Capacity-leading and capacity-lagging strategies and (b) Smoothing with inventory means using the excess capacity of one period to produce inventory which can be used to supply the under-capacity period	137
Figure 4.9	(a) Capacity plans for meeting demand using either 800- or 400-unit capacity plants and (b) Smaller-scale capacity increments allow the capacity plan to be adjusted to accommodate changes in demand	139
Figure 4.10	Rarely does each stage of a supply chain have perfectly balanced capacity because of different optimum capacity increments	141
Figure 4.11	Some factors influencing the location of sites	144
Figure 5.1	Issues covered in this chapter	155
Figure 5.2	Supply networks are the interconnections of relationships between operations	156
Figure 5.3	(a) Dyadic relationships in a simple supply network and example (b) Triadic relationship and example	157
Figure 5.4	The value net (based on Brandenburger and Nalebuff)	160
Figure 5.5	Wimbledon's tennis balls travel over 80,000 kilometres in their supply network	164
Figure 5.6	Types of supply arrangement	166
Figure 5.7	The decision logic of outsourcing	169
Figure 5.8	Generic sourcing strategies	171
Figure 5.9	Supply arrangements are a balance between contracting and relationship	172
Figure 5.10	Elements of partnership relationships	174
Figure 5.11	Fluctuations of production levels along supply chain in response to small change in end-customer demand	182
Figure 5.12	Potential perception mismatches in supply chains	184
Figure 5.13	Typical supply chain dynamics	186

Figure 5.14	Matching the operations resources in the supply chain with market requirements	189
Figure 6.1	Issues covered in this chapter	196
Figure 6.2	Waste product recycling at Marmite	198
Figure 6.3	The generic form of technology road maps (TRMs)	201
Figure 6.4	Simplified example of a technology road map for the development of products/services, technologies and processes for a facilities management service	201
Figure 6.5	The three dimensions of process technology are often closely linked	208
Figure 6.6	The product–process matrix and the technology dimensions	209
Figure 6.7	Market pressures are requiring operations to be both flexible and low cost	211
Figure 6.8	New developments in process technology can change the cost–flexibility trade-off	212
Figure 6.9	The ERP structure for the sandwich company	214
Figure 6.10	Broad categories of evaluation criteria for assessing concepts	218
Figure 6.11	Cash inflows, outflows and requirements up to the finish of the project (€000s)	220
Figure 6.12	Assessing the 'acceptability' of a process technology	221
Figure 6.13	Performance of laboratory analysis and data-based systems	227
Figure 7.1	Issues covered in this chapter	234
Figure 7.2	The 'direct', 'develop', 'deploy' strategic improvement cycle	239
Figure 7.3	Directing improvement is a cycle of comparing targets with performance	240
Figure 7.4	Performance targets can involve different levels of aggregation	242
Figure 7.5	Different standards of comparison give different messages	245
Figure 7.6	The importance–performance matrix	248
Figure 7.7	The importance–performance matrix for TAG's 'overnight temperature-controlled' service	250
Figure 7.8	The sandcone model of improvement; cost reduction relies on a cumulative foundation of improvement in the other performance objectives	251
Figure 7.9	Log-log experience curve for a voucher processing centre	252
Figure 7.10	Knowledge management systems exploit the ability of e-technologies to collect knowledge and connect individuals and knowledge in order to encourage collaboration	258

Figure 7.11	The Nonaka and Takeuchi knowledge model	261
Figure 7.12	Process control may be one of the most operational tasks, but it can bring strategic benefits	263
Figure 7.13	Deploying operations capabilities to create market potential means ensuring that the operations function is expected to contribute to market positioning	264
Figure 7.14	The four-stage model of operations contribution	267
Figure 8.1	Issues covered in this chapter	272
Figure 8.2	The relationship between creativity, innovation and design	274
Figure 8.3	The S-shaped curve of innovation	274
Figure 8.4	The Henderson–Clark Model	275
Figure 8.5	The increasing strategic importance of product and service development	277
Figure 8.6	The link between product/service and process development can be closer in service industries	282
Figure 8.7	Operations strategy analysis for product and service development	287
Figure 8.8	A typical 'stage model' of the product and service development process	288
Figure 8.9	(a) The idealised development funnel (b) The development funnel for one company	291
Figure 8.10	(a) Sequential arrangement of the stages in the development activity (b) Simultaneous arrangement of the stages in the development activity	292
Figure 8.11	Slow or delayed development times, which can be the result of quality or flexibility failures, will increase costs and can reduce revenue	297
Figure 8.12	The 'vicious cycle' of under-resourcing development capacity	299
Figure 8.13	Organisation structures for design processes	305
Figure 9.1	This chapter concerns the formulation and implementation stages of the process of operations strategy	309
Figure 9.2	In operations strategy 'fit' is the alignment between market and operations capability	311
Figure 9.3	Align operations resources with market requirements or align market positioning with operations resources capabilities	313
Figure 9.4	Alignment over time at CAG Recycling Services	317
Figure 9.5	'Fit' is concerned with ensuring comprehensiveness, correspondence, coherence and criticality	325

Figure 9.6	Implementing an operations strategy that involves moving from A to B means understanding current and intended market requirements and operations resource capabilities so that the extent and nature of the change can be assessed	328
Figure 9.7	A typology of the 'central operations' function	331
Figure 9.8	Information relationships for the four types of central operations functions	333
Figure 10.1	This chapter concerns the monitoring and control stages of the process of operations strategy	341
Figure 10.2	Monitoring and control is less clear at a strategic level	342
Figure 10.3	Monitoring and control types	344
Figure 10.4	Process objectives for centralisation of risk assessment departments implementation	347
Figure 10.5	The measures used in the balanced scorecard	350
Figure 10.6	Excessively tight 'fit' can increase the risks of misalignment between market requirements and operations resources capability	352
Figure 10.7	Implementing a strategy that moves an operation from A to B may mean deviating from the 'line of fit' and therefore exposing the operation to risk	353
Figure 10.8	Pure risk has only negative consequences (A to C). Speculative risk can have both positive (A to B) and negative (A to D or A to E) consequences	354
Figure 10.9	The reduction in performance during and after the implementation of a new technology reflects 'adjustments costs'	357
Figure 10.10	Single-loop learning in operations and the potential limitations of single-loop learning	359
Figure 10.11	Double-loop learning questions the appropriateness of operations performance	360
Figure 10.12	'Disruptive' technological change	363
Figure 10.13	Learning potential depends on both resource and process 'distance'	364
Figure 10.14	The stakeholder power–interest grid	365

Tables

Table 1.1	Examples of operations management and operations strategy questions	10
Table 1.2	Competitive factors for three operations grouped under their generic performance objectives	27

Table 1.3	Some decisions in each decision area for a hotel chain and an automobile manufacturer	31
Table 2.1	Typical stakeholders' performance objectives	50
Table 2.2	Examples of 'hard' and 'soft' dimensions of specification quality	57
Table 2.3	The range and response dimensions of the four types of total operations flexibility	60
Table 2.4	Internal and external benefits of excelling at each performance objective	62
Table 2.5	Multiple dimensions of sustainability	80
Table 2.6	Firms can use various criteria to 'focus' on their operations	84
Table 4.1	Three levels of capacity decision	123
Table 4.2	Analysis of existing operation and two options	134
Table 4.3	The advantages and disadvantages of pure leading, pure lagging and smoothing with inventories strategies of capacity timing	138
Table 5.1	How in-house and outsourced supply may affect an operation's performance objectives	167
Table 5.2	A summary of some problems that can arise from asymmetric information	173
Table 5.3	Understanding the qualitative dynamics of supply chains	185
Table 5.4	Coordinating mechanisms for reducing supply chain dynamic instability	187
Table 5.5	Indicative purchasing and supply-related risks	192
Table 6.1	Some process technologies classified by their primary inputs	199
Table 6.2	Evaluating the acceptability of process technology investment on market criteria	223
Table 6.3	The four dimensions of 'strategic' operations resources	225
Table 7.1	Some features of continuous/exploitation improvement and breakthrough/exploration improvement	237
Table 7.2	The degree of process change can be characterised by changes in the arrangement and nature of process activities	238
Table 7.3	Some typical partial measures of performance	244
Table 7.4	Characteristics of Bohn's eight stages of process knowledge	254
Table 8.1	The degree of product/service change can affect both its external appearance and its internal methodology/technology	279
Table 9.1	Internal and external 'defensive' static mechanisms of sustainability	319
Table 9.2	Some possible operations-related factors in a SWOT analysis	321
Table 10.1	Type I and type II errors for the control of an operations strategy implementation	358

Exhibits from case studies

Adani Agri Logistics Limited: Blocking the Grain Drain 375

Exhibit 1 Grain handling, storage and transportation processes—conventional versus bulk 383
Exhibit 2 Comparison of intermediaries in the American and Indian grain supply chains 383
Exhibit 3 Cover and plinth (CAP) storage 384
Exhibit 4 Silos at Adani agri logistics limited 384
Exhibit 5 Cost economics—conventional storage versus silo storage 385

Delta Synthetic Fibres (DSF) 389

Exhibit 1 Current market volumes by product and region, 2004 (millions of kg) 394
Exhibit 2 Forecasts Britlene and Britlon ranges 394
Exhibit 3 Estimated Britlon capital costs 394

GreenDust: Revolutionizing the Returns Process 410

Exhibit 1 Logistics performance index of various countries, 2014 417
Exhibit 2 Annual household consumption 2010—ICT sector in $ (millions) 417
Exhibit 3 GDP per capita and Population Data of Selected Countries, 2013 417
Exhibit 4 Cost of Returns for a digital retailer, 2013 418
Exhibit 5 Technological process flow diagram for GreenDust 418
Exhibit 6 Summary of GreenDust's report card with a digital retailer 419
Exhibit 7 Differences in marginal value of time for returns 419
Exhibit 8 Hofstede's 6-D model for specific countries 419
Exhibit 9 GreenDust product sales—some terms and conditions 420

Ontario Facilities Equity Management (OFEM) 427

Exhibit 1 Revenue projections for the three investment opportunities 430

Operations Strategy at Galanz 431

Exhibit 1 Production and sales of Galanz microwave ovens (1992–2003) 432
Exhibit 2 Revenue and profit of Galanz microwave ovens (2000–2003) 432
Exhibit 3 Transformation of Galanz group in microwave oven business 435
Exhibit 4 Galanz price-cutting cycle 437
Exhibit 5 Stages of Galanz price war in China (1996–2002) 438
Exhibit 6 Magnetrons developed and produced by Galanz (2000–present) 440
Exhibit 7 Company structure of Galanz group in 2002 442

Preface

'Operations' should not be confused with 'operational'. In fact 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, IKEA, Intel, Rolls Royce, Samsung, 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 and 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 four 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 fifth edition. The changes include the following:

- The introduction (and reintroduction) of short and long case studies, while 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.
- 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.
- The inclusion of some new material relating to such issues as the VRIO framework, the idea of the three levels of performance, business ecosystems, and topics in product/service innovation.

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 Master's 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 are also Instructor's manual and PowerPoints 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.

Acknowledgements

Again we have been fortunate enough to receive advice on this and earlier editions from a number of leading academics and industrialists. In particular: Pär Åhlström of Chalmers University, David Barnes of the Open University, Mike Bourne of Cranfield University, Raffaella Cagliano of Politecnico di Milano, Dan Chicksand of Birmingham University, Ben Clegg of Aston University, Paul Coghlan of Trinity College Dublin, Henrique Correa of Rollins College, Pamela Danese of the University of Padova, Roland van Dierdonck of the University of Ghent, Ian Evans of Sunderland University, Kasra Ferdows of Georgetown University, Janet Godsell of Warwick University, Mike Gregory of Cambridge University, Linda Hendry of Lancaster University, Christer Karlsson of Copenhagen Business School, Bart McCarthy of Nottingham University, Samuel B. Larsen of IHK (Copenhagen University College of Engineering), Arunkumar Madapusi of Drexel University, Andy Neely of Cambridge University, Phil Morgan of Oxford Brooks University, Andy Neely of Cranfield University, Jan Olhager of Lund University, Ken Platts of Cambridge University, Dan Paulin of Chalmers University, Giovanni Perrone of the University of Palermo, Zoran Perunovic of Danish Technical University, Gerald Reiner of Université de Neuchâtel, James Rowell of the University of Buckingham, Sofia Salgado Pinto of Universidade Católica Portuguesa, Mike Shulver of Birmingham University, Rui Sousa of Universidade Católica Portuguesa, nigel Spinks of Reading University, Martin Spring of Lancaster University, Ann Vereecke of the University of Ghent, Helen Walker of Cardiff University and Gera Welker of the University of Groningen.

Our academic colleagues at Warwick and Bath Universities also helped us, both by contributing ideas and by creating a lively and stimulating work environment. At Warwick our thanks go to Nicola Burgess, Mehmet Chakkol, Emily Jamieson, Mark Johnson, Pietro Micheli, Ross Ritchie, Rhian Silvestro and Chris Voss. At Bath our thanks go to Chris Archer-Brown, Alistair Brandon-Jones, Paul Goodwin, Emma Brandon-Jones, Jie Chen, Melanie Kreye and Jens Roehrich, Brian Squire and Baris Yalabik.

We are also grateful to many friends, colleagues and company contacts. In particular, thanks go to John Palmer of the Welsh NHS, Nigel Hayter of DS Smith, Steen Karstensen, Henrik Larsen and Morten Bo Christiansen of AP Moller-Maersk, Kevin Doolan, Partner at Moller PSF Group Cambridge and Gerard Chick of Optimum Procurement Group, Peter Norris of the Royal Bank of Scotland, Hans Mayer of Nestlé, Dr Andrew Court of QinetiQ, Tony Solomons, Chris Spencer and Maurice Dunster of Waitrose, Nathan Travis of Gloucestershire Fire and Rescue, John Richardson of Elizabeth Shaw and Dr Hanno Kirner of Rolls Royce Motors.

The team from Pearson Education provided their usual highly professional support. Particular thanks to Natalia Jaszczuk, Caitlin Lisle and Archana Makhija.

Finally, and most importantly, we would like to thank our wives, Angela and Helen, for their forbearance and unwavering support.

Nigel Slack
Michael Lewis

Preface to the Indian Edition

The purpose of the adaptation of the 5th edition of this book on Operations Strategy is to incorporate the Indian context in the course thereby making the course more relevant and connected for the students. The strength of this adapted edition is to actively engage the students by including the real-life examples in Indian context along with the Indian case studies which weave the culture and Indian-ness in the operations study.

The exemplar organizations have been illustrated through the caselets of Patanjali, Akshaya Patra, Fabindia, and Sun Pharma. The case section includes two Indian case studies – Adani Agri Logistics Limited, which highlights issues with technology, supply chain trust and culture; and Green Dust which brings the concept of reverse logistics and sustainability in an Indian context (which is a representation of the emerging economy).

I hope the students of operations strategy will be benefitted and use it for understanding and strategizing various operational issues being experienced in contemporary India.

Finally, I would like to thank the publisher, Pearson Education for bringing the Indian adaptation and would also like to acknowledge the team efforts in getting this accomplished in such a short time. My thanks to Varun and Jubi for their constant endeavour. I am grateful to my guide and mentor Prof. K. N. Singh and my family who always supported and encouraged me. I feel grateful towards my parents for instilling these values of commitment in me.

Mohita Gangwar Sharma
Professor, FORE School of Management,
New Delhi

About the Authors

Professor **Nigel Slack** is Emeritus Professor of Operations Management and Strategy at Warwick Business School, an Honorary Professor at Bath University and an Associate Fellow of Said Business School, Oxford. He is an educator, consultant and writer with wide experience in many sectors.

Professor **Michael Lewis** is Professor of Operations and Supply Management and Head of the Information, Decisions and Operations Group at Bath School of Management. He has teaching, research and consultancy experience with a broad range of public and private sector organisations.

About the Adaptor

Professor **Mohita Gangwar Sharma** is currently Professor (QT and OM) at Fore School of Management, New Delhi. She has completed electrical engineering from IIT-BHU, Varanasi and Masters in International Business from IIFT-New Delhi. She has been a Chevening Rolls-Royce Science and Innovation Fellowship (CRISP) Scholar at SAID Business School ,University of Oxford. She obtained her doctorate from Indian Institute of Management (IIM) Lucknow, making seminal contribution in the area of Spare Parts Management. She brings the rich experience of the industry and tough academic rigor to her research. Her current areas of research include Circular Economy, Sustainable Operations, Operations Strategy, Product Service Systems, Supply Chain Intelligence and Service Operations. She can be reached at mohita@fsm.ac.in.

Publisher's Acknowledgements

We are grateful to the following for permission to reproduce copyright material:

Figures

Figure 5.5 from The 50,000 mile journey of Wimbledon's tennis balls, *WBS News*, 02/07/2014, © Warwick Business School 2014; Figure 5.8 adapted from What Is The Right Outsourcing Strategy For Your Process?, *European Management Journal*, 26 (1), pp. 24–34 (McIvor, R., 2008), Copyright 2008, with permission from Elsevier; Figure 10.3 after Management Control of Public and Not-For-Profit Activities, *Accounting, Organizations and Society*, 6 (3), pp. 193–211 (Hofstede, G., 1981), Copyright 1981, with permission from Elsevier.

Text

Case Study 4 from Micheli, P. and Beer, H., Associate Professor of Organising Healthcare Research Network, Operations Management Group, Warwick Business School, University of Warwick, http://www.wbs.ac.uk/; Case Study 9 from IDEO: Service Design (A), *IDEO*, 1, 606-012 (Ritesh Bhavnani, Manuel Sosa), 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. Copyright © 2006 INSEAD.

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 firms 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 processes 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?*

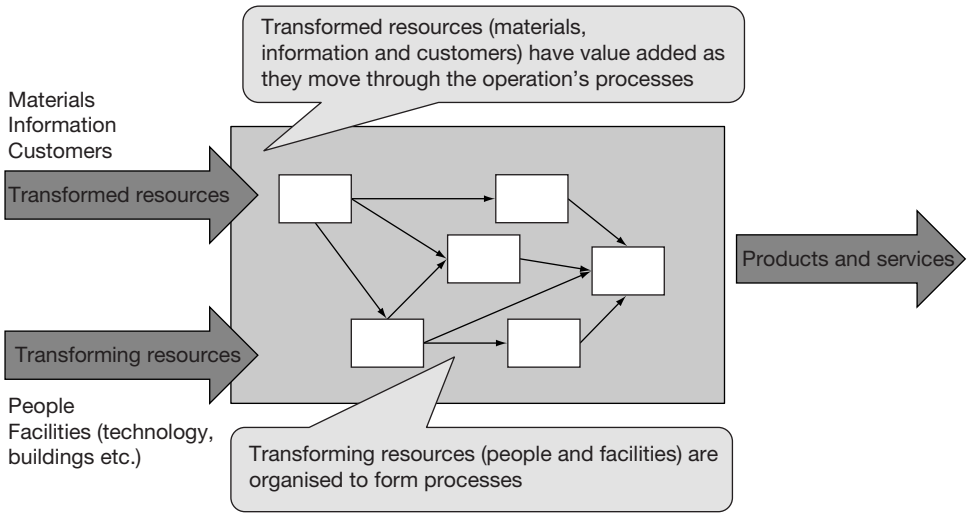
Why is operations excellence fundamental to strategic success?

'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 by a 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 a 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:

1 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.
2 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'.

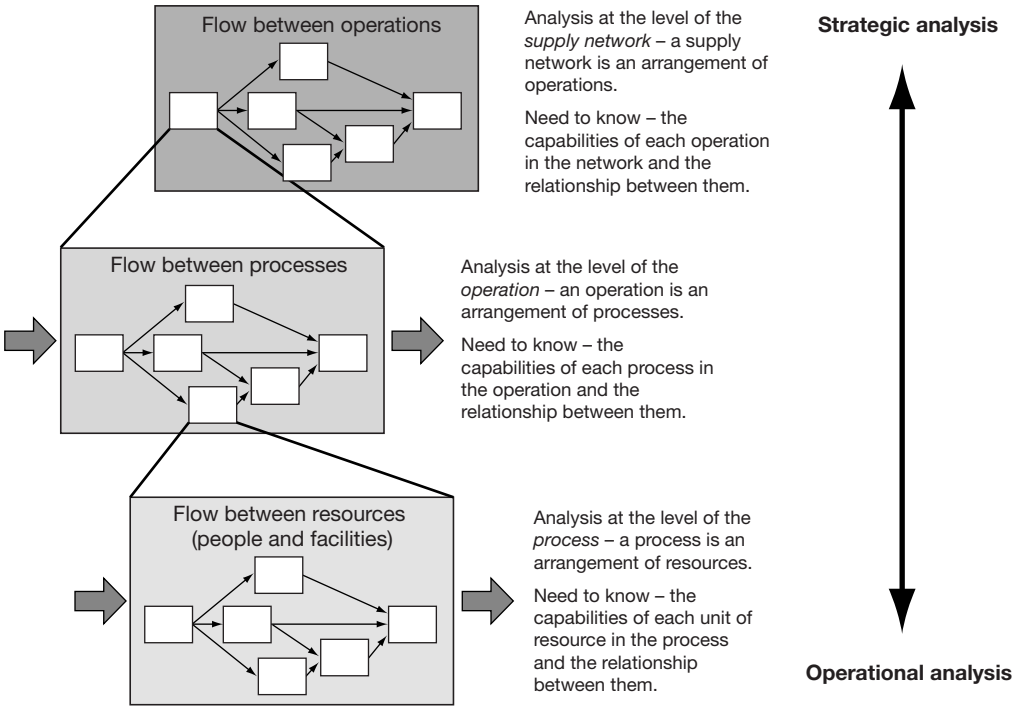
Operations, networks and 'levels of analysis'

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 (e.g. computers), 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



Not all operations are 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 for 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.

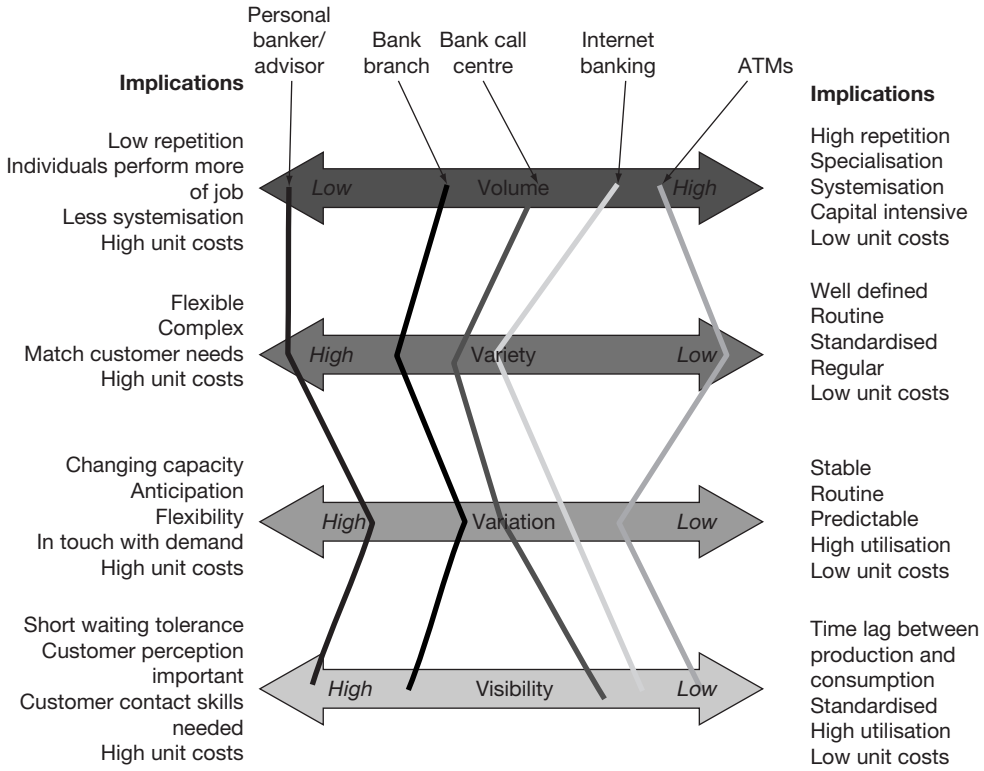
3 **Variation** – Processes are generally easier to manage when they only have to cope with predictably constant demand. Resources can be geared to a level that is just capable of meeting demand. All activities can be planned in advance. By contrast, when demand is variable and/or unpredictable, resources 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 low visibility all help to keep processing costs down. Conversely, low volume, high variety, high variation and high

Figure 1.3 The Four Vs analysis for some retail banking services

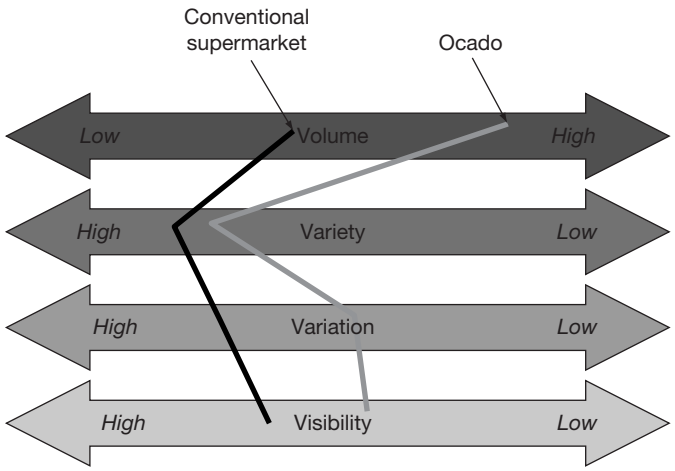


customer contact generally carry some kind of cost penalty for the process. This is why the volume dimension is often drawn with its 'low' end at the left, unlike the other dimensions, to keep all the 'low cost' implications on the right. Figure 1.3 summarises the implications of such positioning and 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

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



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). 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.

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.

Nor is operations strategy simply a blend of the subjects of operations management and strategic management. It is an operations-based subject that is concerned with operations issues.

Its feet are firmly in the operations 'camp', even if its direction and purpose are strategic. Perhaps more significantly, it believes that many of the businesses that seem to be especially competitively successful, and who appear to be sustaining their success into the longer term, have a clear (and often innovative) operations

Table 1.1 Examples of operations management and operations strategy questions

Difference	*Operations management example*	*Operations strategy example*
Longer time-scale	*'What demand fluctuations do we have to deal with over the next few months?'*	*'When should we plan to add further capacity so that we can meet rising forecast demand?'*
Higher level of analysis	*'Where should we position each product category within our department store?'*	*'How many stores should we have, where should we locate them and how should we supply them?'*
Higher level of aggregation	*'How do we provide tax advice to the small business sector in Antwerp?'*	*'What is our overall business advice capability compared with our other European activities?'*
Higher level of abstraction	*'How do we improve our purchasing procedures?'*	*'Should we develop strategic alliances with selected medical products suppliers?'*

strategy. Just look at some of the high-profile companies quoted in this book, or that feature in the business press. From Tesco to IKEA, from Ryanair to Singapore Airlines, it is not just that their operations strategy provides these companies with adequate support; it is their operations strategy that is the pivotal reason for their competitive superiority. Even businesses, such as Coca-Cola or Heinz, that are more marketing and brand-driven need a strong operations strategy. Their brand position may be shaped in the consumers' mind by their promotional activities, but it would soon erode if they could not deliver products on time, or if their quality was sub-standard, or if they could not introduce new products in response to market trends. So, for example, a 'fast-moving consumer goods' (FMCG) company that has operations that are capable of mastering new process technologies, or flexing their capacity, or running agile yet efficient supply chains, or continually cutting cost out of the business through its improvement programme, will have a huge advantage over less capable rivals.

Four perspectives on operations strategy

Just as there is no overall agreement about what 'strategy' means, there is no universal agreement on how 'operations strategy' should be described. Different authors have slightly different views and definitions of the subject. Between them, four 'perspectives' on the subject emerge.

1 Operation strategy is a 'top-down' reflection of what the whole group or business wants to do.
2 Operations strategy is a 'bottom-up' activity where operations improvements cumulatively build strategy.
3 Operations strategy involves translating 'market requirements' into operations decisions.
4 Operations strategy involves exploiting the capabilities of 'operations resources' in chosen markets.

None of these four perspectives alone gives the full picture of what operations strategy is. But together they provide some idea of the pressures that go to form the content of operations strategy. We will treat each in turn (see Figure 1.5).

How should operations strategy reflect higher-level strategy? The top-down perspective

An operations strategy must reflect the decisions taken at the top of the organisation, which set the overall strategic direction of the organisation. This is called a 'top-down' approach to operations strategy. So, if the organisation is a large, diversified corporation, its corporate strategy will consist of decisions about what types of business the group wants to be in, in what parts of the world it wants to operate, what businesses to acquire and what to divest, how to allocate its cash between its various businesses and so on. Within the corporate group, each business unit will also need to put together its own business strategy, which sets out its individual mission and objectives, as well as defining how it intends to compete in its markets. Similarly, within the business each function will need to consider what part it should play in contributing to the strategic and/or competitive objectives of the business by developing a functional strategy that guides its actions within the business. So, in the 'top-down' view, these three levels of strategy – corporate, business and functional – form a hierarchy, with business strategy forming the context of functional strategies and corporate strategy forming the context of business strategies.

Figure 1.5 Four perspectives on operations strategy – top-down, bottom-up, market requirements and operations resources

A metrology instruments company example

For example, a manufacturer of metrology instruments is part of a group that contains several high-tech companies. It has decided to compete by being the first in the market with every available new product innovation. Its operations function, therefore, needs to be capable of coping with the changes that constant innovation will bring. It must develop processes that are flexible enough to manufacture novel parts and products. It must organise and train its staff to understand the way products are developing so that they can put in place the necessary changes to the operation. It must develop relationships with its suppliers that will help them to respond quickly when supplying new parts. Everything about the operation – its technology, its staff and its systems and procedures – must, in the short term, do nothing to inhibit the company's competitive strategy.

How can operations strategy learn from day-to-day experience? The bottom-up perspective

In reality, the relationship between the levels in the strategy hierarchy is more complex than the top-down perspective implies and certainly does not represent the way strategies are always formulated. Businesses, when reviewing their strategies, will (hopefully) consult the individual functions within the business. In doing so, they may also incorporate the ideas that come from each function's day-to-day experience. Therefore, an alternative view to the top-down perspective is that many strategic ideas emerge over time from actual experiences. Sometimes companies move in a particular strategic direction because the ongoing experience of providing products and services to customers at an operational level convinces them that it is the right thing to do. There may be no high-level decisions examining alternative strategic options and choosing the one that provides the best way forward. Instead, a general consensus emerges, often from the operational level of the organisation. The 'high-level' strategic decision making, if it occurs at all, may confirm the consensus and provide the resources to make it happen effectively. This idea of strategy being shaped by experience over time is sometimes called the concept of emergent strategies.[4] Strategy gradually becomes clearer over time and is based on real-life experience rather than theoretical positioning. Indeed, strategies are often formed in a relatively unstructured and fragmented manner to reflect the fact that the future is at least partially unknown and unpredictable. This may seem not to be a particularly useful guide for specific decision making. Yet, while emergent strategies are less easy to categorise, the principle governing a bottom-up perspective is clear: 'shape the operation's objectives and action, at least partly, by the knowledge it gains from its day-to-day activities'. The key virtues required for doing this are an ability to learn from experience and a philosophy of continual and incremental improvement that is built into the strategy-making process.

A metrology instruments company example (continued)

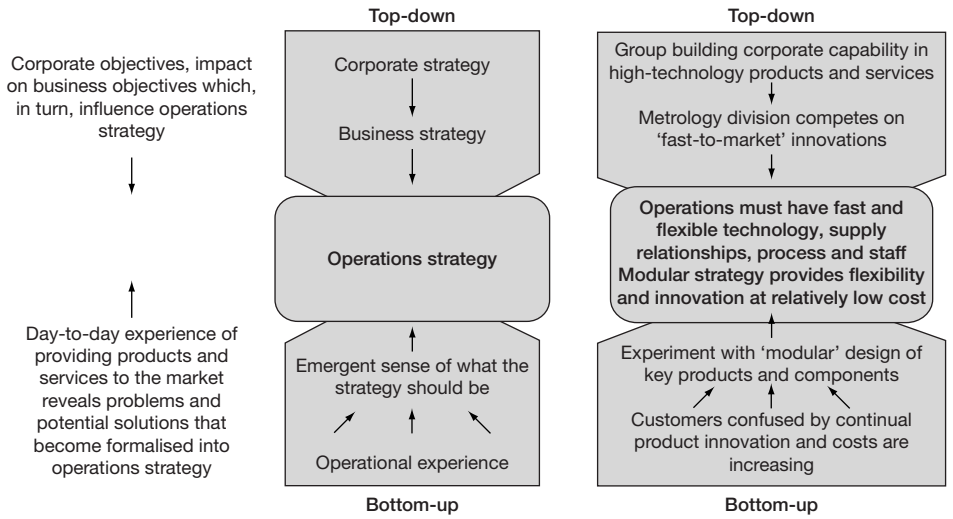
For example, the manufacturer of metrology instruments, described earlier, discovers that continual product innovation both increases its costs and confuses its customers. The company's designers therefore work out a way of 'modularising' their product designs so that one part of the product can be updated without interfering with the design of the main body of the product. This approach becomes standard design practice within the company. Note that this strategy has emerged from the company's

experience. No top-level board decision was probably ever taken to confirm this practice, but nevertheless it emerges as the way in which the company organises its designs. Figure 1.6 illustrates both the top-down and bottom-up for this example.

How do the requirements of the market influence operations strategy? The market requirements perspective

Operations exist to serve markets. Indeed, a sensible starting point for any operations strategy is to look to its markets and ask the simple but important question, 'How can operations help the organisation to compete in its market place?' Remember, though, that the organisation itself usually has some influence over what its markets demand, if for no other reason than that it has chosen to be in some markets rather than others. Therefore, by choosing to inhabit a particular market position, the organisation is, to some extent, influencing how easy it is for the operations function to support the market position. This opens up the possibility that, in some circumstances, it may be sensible to shift the markets in which the organisation is trying to compete, in order to reflect what its operation is good (or bad) at. We shall discuss this in more detail later; for now we return to the important point that operations strategy must reflect the organisation's market position. And the starting point for this is to develop an understanding of what is required from the operation in order to support the market position. One problem with this is that the concepts, language and, to some extent, philosophy used by the marketing function to help them understand that markets are not always useful in guiding operations activities. So, descriptions of market needs developed by marketing professionals usually need 'translating' before they can be used in an operations strategy analysis.

Figure 1.6 Top-down and bottom-up perspectives of strategy for the metrology company



Example **Everyday low prices at Aldi**[5]

Aldi has become one of the fastest growing retailers in Europe. It is an international 'limited assortment' supermarket specialising in 'private label', mainly food products. The firm has carefully focused its service concept and delivery system to attract customers in a highly competitive market. The company believe that their unique approach to operations management make it, '. . . virtually impossible for competitors to match our combination of price and quality'. And in It has proved especially successful in meeting the increasingly price-conscious behaviour of customers. How have they done this? By challenging the norms of how they organise their retail operations. They keep their in-store and supply operations deliberately simple, using basic facilities to keep down overheads. Most stores stock only a limited range of goods (typically around 700, compared with 25,000 to 30,000 stocked by conventional supermarket chains). Their private label approach means that the products have been produced according to Aldi-quality specifications and are only sold in Aldi stores. Without the high costs of brand marketing and advertising and with Aldi's formidable purchasing power, prices can be 30 per cent below their branded equivalents. Other cost-saving practices include open carton displays, which eliminate the need for special shelving, no grocery bags to encourage recycling as well as saving costs, multiple bar codes on packages (to speed up scanning) and using a 'cart rental' system, which requires customers to return the cart to the store to get their coin deposit back.

Market positioning is influenced by (amongst other things) customers and competitors. Both, in turn, influence operations strategy. Market segmentation is a common approach to understanding markets by viewing heterogeneous markets as a collection of smaller, more homogeneous, markets. Usually, this is done by assessing the needs of different groups of potential users in terms of the needs that will be satisfied by the product or service. Segmentation variables help to classify these needs. The marketing purpose of segmentation is to ensure that the product or service specification, its price, the way it is promoted and how it is channelled to customers are all appropriate to customer needs. However, market segmentation is also important in shaping operations strategy. The same needs that define markets will shape the objectives for operations' attempt to satisfy those needs. Similarly, how an organisation chooses to position itself in its market will depend on how it feels it can achieve some kind of advantage over its competitors. This, of course, will depend on how its competitors have positioned themselves. Although one particular segment of a market may look attractive, the number of other companies competing in it could deter any new entrants. However, if a company sees itself as having the operations capability of servicing that market better, even in the face of the competition from other firms, it may be worth entering the market. So, both customer and competitor analysis is a prerequisite to developing an effective operations strategy.

A theatre lighting example

The original business of a medium-sized theatre lighting company was devoted to designing the lighting arrangements and hiring the necessary equipment for theatrical and entertainment events, exhibitions and conferences. The company could supply any specialist lighting equipment, partly because it held a wide range and partly because it had developed close relationships with other equipment hire firms. It also focused on the 'top end' of the lighting market, targeting customers who were less price-conscious. This was becoming a problem in the theatre lighting and exhibition markets

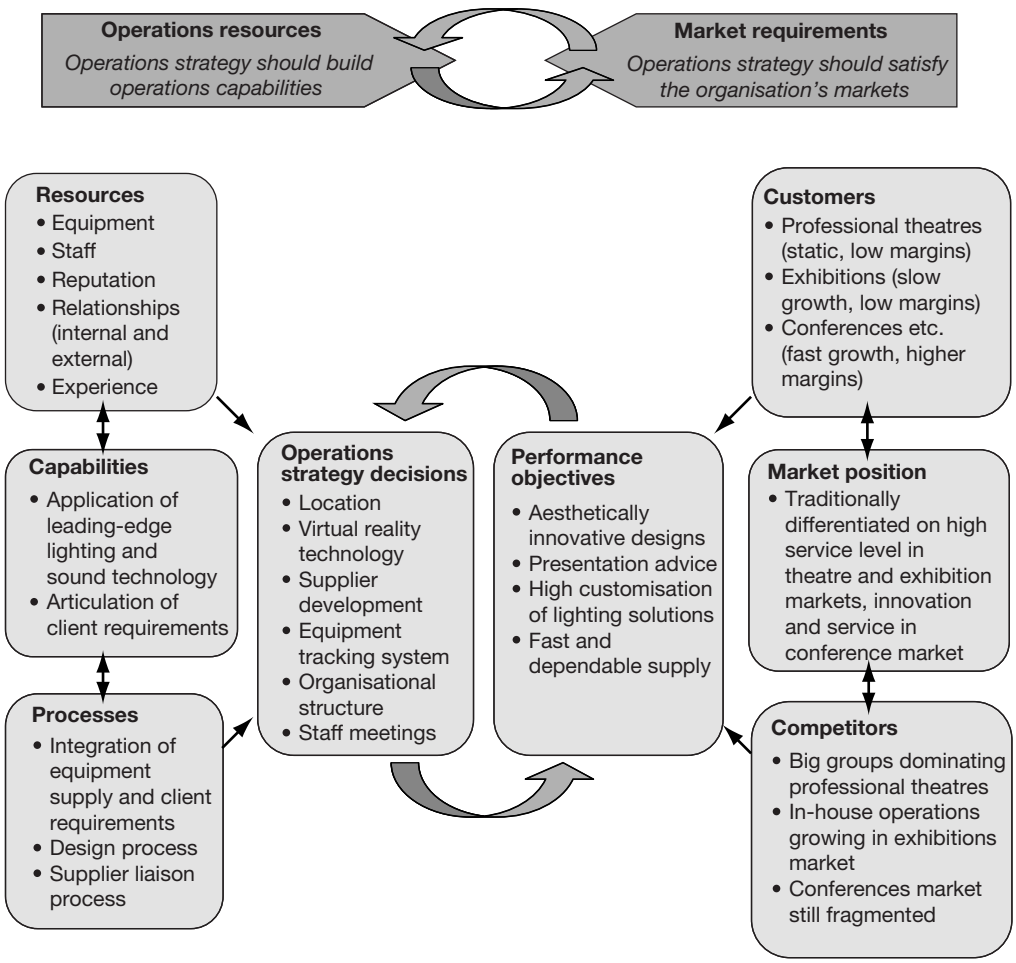
because competition was forcing margins lower as competitors undercut prices. Soon they realised that the greatest potential for profitable growth lay in the conference market, where competition was not yet as fierce and where its high (but expensive) service levels, ability to give presentation advice and innovation were valued. The right-hand side of Figure 1.7 illustrates how this analysis of the company's customers and competitors sets the performance objectives for its operations strategy.

In this case the 'translation' logic goes something like the following:

1 There are several segments in the lighting design and supply market, but the fastest-growing segment is the conference market.

2 Competition is getting tougher in the theatre market because the large international lighting groups are able to provide lower-cost lighting solutions. Also, exhibition venues are increasingly developing in-house operations and encouraging exhibitors to use the in-house service. Margins are being squeezed in both markets.

Figure 1.7 The 'market requirements' and 'operations resource' analysis of the lighting company



3 The company has therefore chosen to target the broad conference market, where margins and growth are higher.
4 They believe they can differentiate themselves from competitors by their aesthetically innovative designs, ability to give good presentation advice, high customisation of lighting solutions and fast and reliable supply.
5 Operations, therefore, needs to prioritise high-quality technical and aesthetic consultancy advice, customisation, fast response and dependability.

Although these are somewhat simplified statements, they demonstrate a path of increasing specificity, with increasing meaning to the operations function of the business. Not all businesses work through this logic in such a systematic way, nor is it intended to be a prescription, as such, but it is an example of how the market to operations *translation* process can work. This perspective on operations strategy is sometimes called the 'outside-in' perspective.

Performance objectives

The last stage of analysis described above needs more explanation. This is the stage that identifies the performance objectives for the operation; that is, the aspects of operations performance that satisfy market requirements and therefore that the operation is expected to pursue. Many authors on operations strategy have their own set of performance objectives, and no overall agreement exists on terminology. They are referred to variously as 'performance criteria', operations 'strategic dimensions', 'performance dimensions', 'competitive priorities' and 'strategic priorities'. Here, we will be using the term 'performance objectives'. While there are differences between authors as to exactly what these performance dimensions are, there are some commonly used categories. Here, we will use a set of five performance objectives that have meaning for any type of operation (though obviously their relative priorities will differ). Within these five we will subsume the other dimensions.

1 Quality
2 Speed
3 Dependability
4 Flexibility
5 Cost

Performance objectives and the issue of performance, in general, will be examined in more detail in the following chapter.

How can the intrinsic capabilities of an operation's resources influence operations strategy? The operations resource perspective

The resources and processes within an operation are not simply passive elements; they have an existence and a role that should be part of any operations strategy. No surprise, then, that the long-term management of resources and processes is often regarded as the underlying rationale for operations strategy (although, generally, we drop the 'processes' bit and just call this perspective the 'operations resource' perspective). The problem again is one of translation because the approach and terminology that are useful for understanding a firm's resources are not necessarily appropriate to clarify the nature of

the decisions that shape those resources. A useful starting point is to understand 'what we have' – that is, the totality of the resources owned by, or available to, the operation. Next, one needs to link the broad understanding of resources and processes with the specific operations strategy decisions: 'what actions we are going to take'. To achieve this linkage we need a concept to bridge the gap between the sometimes fuzzy understanding of 'what is there' and the necessarily more specific 'what should we do?' stages. In the operations resource perspective we use the concept of operations capabilities.

Operations resources, processes, routines and capabilities

Listing its resources provides a first step in understanding an operation, but this is rather like describing an automobile by listing its component parts. To understand how an operation works we need to examine the interaction between its resources. For example, how different resources, such as processing centres, are positioned relative to each other, how staff are organised into units and so on. These arrangements of resources constitute the processes of the operation that describe the way things happen in the operation. To return to the automobile analogy, processes are the mechanisms that power, steer and control its performance. Yet even this technical explanation of an automobile's mechanisms does not convey either the full extent of how it performs on the road or its style, feel and 'personality'. Similarly, any view of an operation that limits itself to a description of its obvious tangible resources and processes fails to move our knowledge of the operation beyond the most basic level. Any audit of a company's resources and processes needs to include the organisation's intangible resources. These are the factors that may not be directly observable but are nonetheless significant in enabling any company to function. They include such things as

- supplier relationships, contracts and mutual understanding of how suppliers are managed;
- knowledge of, and experience in, dealing with technology sources and labour markets;
- process knowledge relating to the day-to-day production of products and services;
- new product and service development skills and procedures; and
- contacts and relationships in the market that enable an understanding of market trends and more specific customer needs.

Notice how many of the issues concerning intangible assets involve not so much what an operation has, but what it does. All operations have documented procedures to formalise their regular activities, such as 'generating orders', 'fulfilling orders', 'developing new products and services' and so on. But they also have ways of getting things done that are less formally documented. The effectiveness of these informal practices depends on the relationships between individual staff, their shared values and understandings of overall objectives, the tacit (non-articulated) knowledge accumulated by individuals, an understanding of 'who knows what' and 'who can get things done' and so on. It is these informal arrangements of a company's resources that go a long way to explaining the effectiveness of its operations. Not that the formal processes are unimportant. It is the combination of formal and informal processes, explicit and tacit knowledge, the intrinsic attributes of the company's resources and the way in which these resources are deployed that describes an operation's abilities. The collective term for both formal and informal processes is the 'routines' of the firm. Accountants have considerable trouble when

dealing with intangible resources (or invisible assets as they are sometimes called). Yet intangible assets are often the reason for a firm's success. Bill Gates, who guided Microsoft in its most successful years, pointed out that *'. . . our primary assets, which are our software and software development skills, do not show up in the balance sheet at all'.*[6]

Example **Amazon develops its operations capabilities[7]**

A firm's competencies are not always immediately apparent – they develop, sometimes to take a firm in surprising directions. To most of us, Amazon is generally seen as an online retailer that started selling books and now provides the biggest internet 'shop front' for all types of consumer products. Yet, over time, Jeff Bezos, Amazon's founder, has turned the company into a provider of infrastructure and services to many other firms, including many of its retail rivals. Amazon's store front is just the tip of an iceberg that touches so many people's lives that, according to some commentators, 'they're becoming as important as utilities'. As Jeff Bezos puts it: *'We are creating powerful self-service platforms that allow thousands of people to boldly experiment and accomplish things that would otherwise be impossible or impractical.'* In other words, the firm's resources and processes (customer information, cloud computing server space, high-technology warehouse facilities, data mining expertise and so on) allow other companies to 'outsource' even their core processes to Amazon. In effect, Amazon can offer services that run marketing, customer relationships, payments, computing, logistics and distribution for any company wanting to sell its goods and services to the public.

It may not be glamorous, but Amazon has focused on what have been called 'the dull-but-difficult tasks' such as tracking products, managing suppliers, storing inventory and delivering boxes. Fulfilment by Amazon allows other companies to use Amazon's logistics capability, including the handling of returned items, and access to Amazon's 'back-end' technology.

Amazon Web Services, its cloud computing business, provides the computing power for small and larger high-profile customers, such as Spotify's digital music service and Netflix's video streaming service. But why should any business want to allow Amazon to have such control over its activities? Mainly because it allows entrepreneurs to create start-ups and established companies to expand their activities without the huge investment they would need to build appropriate infrastructure themselves. Amazon's large and efficient operations are also better value than smaller companies could achieve. On the other hand, it does mean that businesses using Amazon's services do lose some autonomy – Amazon can be both a rival retailer and a service provider. Amazon is also able to see some of their critical business details, such as sales and inventory levels. And what's in it for Amazon? Well, profit – generally, the service fees it charges companies are more profitable than buying and selling the products itself.

At first, some observers criticised Amazon's apparent redefinition of its strategy. 'Why not', they said, 'stick to what you know, focus on your core competence of internet retailing?' Bezos's response was clear: '*We* are *sticking to our core competence.... The only thing that's changed is that we are exposing it for (the benefit of) others.'*

The resource-based view of the firm

The concepts of intangible (or invisible) resources and of routines are central to what is sometimes called the 'resource-based view' (or RBV) of strategic management. The resource-based view is based on the notion that most companies consider themselves to be particularly good at some specific activities, but try to avoid head-to-head competition in others. It has its origins in early economic theory. Some of the initial works

in strategic management also included consideration of the firm's internal resources. The 'SWOT' (strengths/weaknesses/opportunities/threats) approach saw competitive advantage as exploiting the opportunities raised in the competitive environment using the firm's strengths, while neutralising external threats and avoiding being trapped by internal weaknesses. While one school of thought, the 'environmental' school, focused on a firm's opportunities and threats, the other, the 'resource-based', focused on a firm's strengths. The two schools of thought differ in the way they explain why some companies outperform others over time – what strategists call a 'sustainable competitive advantage' (SCA). Through the 1970s and 1980s, the dominant school, the environmental school, saw a firm's performance as being closely related to the industrial structure of its markets. In this view, key strategic tasks centred on how a firm positioned itself within its market. It should analyse the forces present within the environment in order to assess the profit potential of the industry, and then design a strategy that aligns the firm to the environment. By contrast, the 'resource-based' explanation of why some companies manage to gain sustainable competitive advantage focuses on the role of the resources that are (largely) internal to the company's operations. Put simply, 'above-average' performance is more likely to be the result of the core capabilities (or competences) inherent in a firm's resources than its competitive positioning in its industry.

The RBV also differs in its approach to how firms protect any competitive advantage they may have. The environmental view sees companies as seeking to protect their competitive advantage through their control of the market – for example, by creating barriers to entry through product or service differentiation. By contrast, the RBV sees firms being able to protect their competitive advantage by building up 'difficult-to-imitate' resources. So the resources that a firm possesses are closely linked to its ability to outperform competitors. Certain of these resources are particularly important, and can be classified as 'strategic' if they exhibit the following properties.

- They are scarce. Unequal access to (or information about) resources can lead to their uneven distribution amongst competing firms. In this way, scarce resources such as specialised production facilities, experienced engineers, proprietary software etc. can underpin competitive advantage.
- They are imperfectly mobile. Some resources are difficult to move out of a firm. For example, resources that were developed in-house, or are based on the experience of the company's staff, cannot be traded easily. As a result, the advantages that they create are more likely to be retained over time.
- They are imperfectly imitable and imperfectly substitutable. These critical dimensions help define the overall sustainability of a resource-based advantage. It is not enough only to have resources that are unique and immobile. If a competitor can copy these resources or, less predictably, replace them with alternative resources, then their value will quickly deteriorate. Again, the more the resources are connected with tacit knowledge and routines embedded within the firm, the more difficult they are for competitors to understand and to copy.

The VRIO framework

The most common (and useful) way of evaluating potential strategic resources is what has become known as the VRIO framework.[8] It was first developed by Barney in the 1990s[9] (who originally identified the idea of resources needing to be scarce, imperfectly

mobile, imperfectly imitable and imperfectly substitutable) but later modified to make it more useful for practitioners. In this framework, the resources must be valuable (V), rare (R), imperfectly imitable (I) and the firm organised to capture the value of the resources (O). So, using this framework, the four questions to ask about any potentially strategic resource are as follows

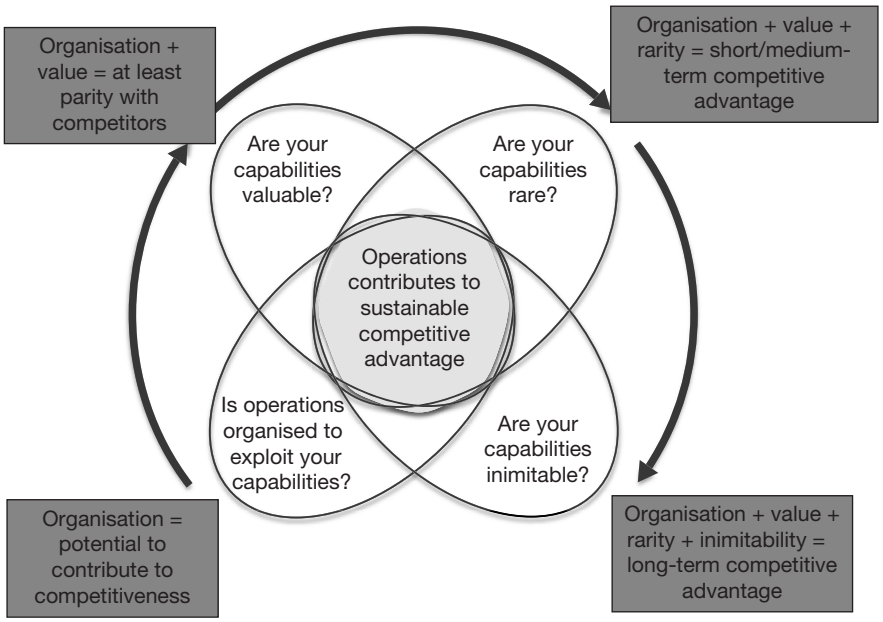
1 **Is the resource valuable?** Is it possible to identify specific and definable competitive value from the resources? Do they help to exploit opportunities in the market, or defend against threats from competitors and, if so, exactly how? Remember though, what counts as valuable depends on the markets in which a business is competing. Resources that have value in one market, at one point in time, will not necessarily be valuable in other markets or at other times. If markets change, what counts as 'valuable' may change.
2 **Is the resource rare?** Do you have, or have access to, resources that your competitors do not? Some theorists define the idea of 'rarity' as when a business has a resource that is unequivocally unique, but for all practical purposes, a resource is 'rare' if it is, at least, in short supply and likely to remain so.
3 **Is the resource costly to imitate?** Do you have resources that competitors cannot imitate, purchase or find a suitable alternative to, at a realistic cost or in a realistic time frame? Note that 'imitability' may be either because competitors can copy your resources and processes directly, or because they can find an acceptable substitute for them.
4 **Is the firm organised to capture the value of the resource?** Do a firm have within its business the systems, culture, capacity and motivation to exploit any capabilities embedded in its resources and processes? Even if a firm has valuable, rare and inimitable capabilities, it may not be able to exploit them. A firm must have the formal reporting and control mechanisms, leadership and the informal and cultural environment that allows the strategic resources to develop.

There are two important points to remember about the VRIO framework. First, all these factors are time dependent. A capability may be currently valuable now, but competitors are unlikely to stand still. Nor are rarity and inimitability absolutes and, with time, they can be undermined by competitor activity. Even the ability to exploit capabilities can erode if operations leadership is lacking. Second, although the conventional order in which to treat each of these elements is as we have done here (which is why it's called the VRIO framework), it is best to think of the 'O' of 'organisation' to be a necessary prerequisite. Without the ability to exploit strategic resources, they are of little use. However, with effective organisation there is the potential for operations resources to contribute to competitiveness. If their capabilities are also valuable, then parity with competitors should be possible. With the addition of rarity, a short- to medium-term competitive advantage is possible. With the addition of inimitability, competitors will find it difficult to match capabilities in anything but the long term. This sequence is shown in Figure 1.8.

Extended resource-based theory (ERBT)[10]

In recent years, resource-based theory (RBT) has been developed by some theorists to include the influence of the wider supply network of which the firm is a part. This idea is termed the 'extended' RBT (ERBT). It assumes that even strategic resources that are outside the boundaries of the firm can still be used to generate strategic advantage for

Figure 1.8 The four features of the VRIO framework



Source: From Slack N. (2017) The Operations Advantage, London: Kogan Page. (Reproduced by permission.)

the firm. Of course, this assumes that these strategic resources beyond the boundaries of the firm can be readily accessed. In other words, the relationships between operations within a supply network are suitably strong and/or collaborative, and the synergy between resources within each firm sufficiently close, to make access to another firm's resources valuable.

A theatre lighting example (continued)

As an example of the operations resource perspective, we return to the lighting business described earlier. Its market requirements analysis had indicated a shift towards targeting commercial companies who needed lighting designs (and often specialised equipment) for sales promotion events, conferences, displays and exhibitions. An analysis of the firm's resources, processes and capabilities revealed that the company's history and experience of advising theatrical producers was a valuable asset, particularly in the conference market. It allowed them to excel at understanding how to translate someone else's vision into theatrical reality. Furthermore, their lighting and sound technicians were experienced at reprogramming equipment and configuring equipment to fit almost any concept their clients wanted. These skills, combined with an intimate network of contracts with equipment and software suppliers, enabled the company to outperform competitors and eventually dominate this (for them) new market. In order to maintain its competitive advantage, it opened new sites in a number of locations where existing and potential customers were located, all of which had a resident lighting and sound design expert. The company also developed a virtual reality simulation, which

helped demonstrate to potential customers how a set might look. This simulation was developed in consultation with key equipment suppliers, to utilise their expertise. In order to make all equipment readily available at all sites, it installed a computer-based equipment tracking and scheduling system that was integrated across all sites. The company also organised periodic 'state-of-play' conferences, where all staff discussed their experiences of serving clients. Some suppliers and customers were invited to these meetings.

Consider this example and how its resources have helped it to compete so effectively. Figure 1.7 illustrates how the firm has 'translated' an understanding of its resources to a set of operations strategy decisions. The translation logic goes something like this:

1 We have a set of equipment that is sophisticated and useful in the theatre lighting business; we also have some staff who have sound and lighting design expertise.
2 As a company we have developed a reputation for being able to take a theatre director's 'vision' for a production, and use our knowledge to make it reality – even improving the original vision.
3 What allows us to do this so well is the way we have 'grown up together' and are able to understand all the stages of satisfying customers, from an understanding of what equipment is available right through to managing the design, installation, operating and dismantling of the production.
4 These capabilities are particularly attractive in the commercial conference market, which is now our target market.
5 In order to consolidate and sustain this competitive position, we must make a number of resource decisions as to how our capabilities can be preserved, developed and deployed – for example, concerning location, virtual reality technology, supplier development, tracking systems and organisational structure.

Example **Thrift is at the core of IKEA's culture[11]**

Core competencies can be strongly linked to a firm's origins and history. And there are few better examples than IKEA – a firm that owes many aspects of how it operates to its origins in Sweden.

The flat-pack specialist is the world's largest furniture chain, with over 300 outlets around the world. *'Thrift is the core of IKEA's corporate culture',* says Mikael Ohlsson, IKEA's Chief Executive, who traces the thrift culture back to the company's origins in Smaland – a poor region in southern Sweden whose inhabitants, he says, are *'stubborn, cost-conscious and ingenious at making a living with very little'.* Ever since Ingvar Kamprad founded IKEA more than 70 years ago, the company has endeavoured to allow '*people with limited means to furnish their houses like rich people*'. Even those people who dislike queuing in its huge warehouse-like stores, or assembling its flat-pack furniture at home, acknowledge that IKEA's products are both stylish and remarkably cheap. '*We hate waste',* says Mikael Ohlsson. As an example, he points to one of their popular three-seater sofas. IKEA's designers developed a new packing method that squeezed twice the amount of sofa into the same space. This trimmed €100 from the price and reduced the carbon-dioxide emissions from transporting it.

But culture can work in less positive ways. IKEA has been accused of being instinctively secretive and, according to some, rigidly hierarchical. Certainly the firm's ownership structure is not straightforward.

A private Dutch-registered company is IKEA's parent, which, in turn, belongs entirely to a tax-exempt Dutch-registered entity – Foundation. A five-person executive committee runs Foundation. Separately, another private Dutch company, whose parent company is registered in Luxembourg, owns the IKEA trademark and concept. And, although the owners of this company remain hidden from view and IKEA refuses to identify them, they have been traced to a Liechtenstein foundation controlled by the Kamprad family, which earns its money from franchise agreements with IKEA stores. Mr. Kamprad has been reported as saying that, '*tax efficiency was a natural part of the company's low-cost culture'.*

So, what *is* operations strategy?

The four perspectives on operations strategy that we have outlined are not 'alternative' views of what is operations strategy. Operations managers can (and should) hold all four views simultaneously. They simply represent alternative starting points for understanding the nature, scope and rationale of operations strategy. Bringing all four views together can even expose the dilemmas inherent within an operations strategy. In fact, operations strategy can be seen as the attempt to reconcile all four perspectives: the top-down with the bottom-up view, and the market requirements with the operations resource view. But there can be tensions between the perspectives.

The tension between the market requirements perspective and the operations resource perspective is central to the decisions that make up an operations strategy. Operations managers must obviously satisfy the requirements of the market if their enterprise is to survive in the long term. Yet, simply following a market is unlikely to provide long-term competitive advantage. After all, competitors will themselves be attempting to do the same thing. To escape from being permanently 'jerked around' by the dynamics of the market, operations should also be attempting to develop the long-term capabilities that competitors will find difficult to imitate. This is why our definition of operations strategy, and the main theme throughout this book, encompasses the reconciliation of market requirements with operations resources.

This is actually a very complex interaction. Sometimes the complexity lies in the difficulty most organisations have in clarifying either the nature of market requirements or the characteristics of their operations resources. Sometimes this is simply because not enough effort is put into clarifying their intended markets. Some operations strategies are formulated without the context of a well-understood market and/or business strategy. But, even in better-managed companies, market requirements may be unclear. For example, a company may compete in many different markets that exhibit sometimes subtle, but nevertheless important, differences in their requirements. Furthermore, markets are dynamic. Neither customers nor competitors are totally predictable. Customer behaviour may change for reasons that become clear only after the event. Competitor reaction, likewise, can be unpredictable and sometimes irrational. The links between customers, competitors and market positioning are not always obvious. Market positioning is not an exact science, and the strategic reconciliation process of operations strategy may have to take place under conditions of both uncertainty and ambiguity. The operations resources side of the equation may be equally unclear. Businesses do not always know the value, abilities or performance of their own resources and processes. Notwithstanding the popularity of the 'core competence' concept, organisations frequently find difficulty in identifying what are, could be, or should be their core competences. More significantly,

the resources and processes within the operation are not deterministically connected, like some machine where adjustments to levers of control lead inexorably to a predictable and precise change in the behaviour of the operation. The cause–effect mechanisms for most operations are, at best, only partially understood.

A company may find that its intended market position is matched exactly by the capabilities of its operations resources, the strategic decisions made by its operations managers having, over time, generated precisely the right balance of performance objectives to achieve a sustainable competitive advantage in its markets. Then again, it may not. In fact, even where it is understood, the capabilities of its operations resources are unlikely to be in perfect alignment with the requirements of its markets. The objective of operations strategy is to attempt this alignment over time without undue risk to the organisation. Operations managers must attempt to do this through the process of reconciliation, a process that is ongoing and iterative. We can include this concept of 'reconciliation' into our definition of operations strategy.

Operations strategy is the total pattern of decisions that shape the long-term capabilities of any type of operation and their contribution to overall strategy, through the reconciliation of market requirements with operations resources.

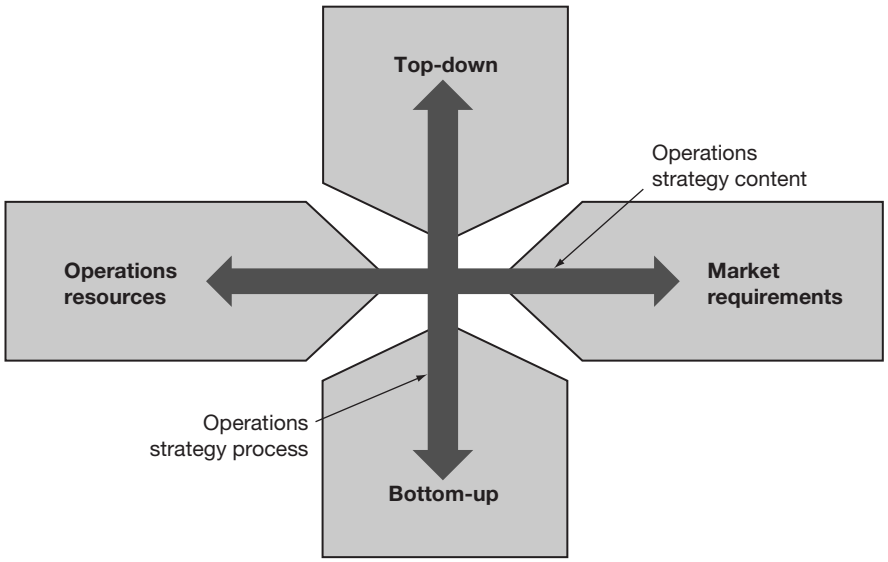
Similarly, there will usually be tension between the top-down and bottom-up perspectives. The top-down perspective is the most common view of what strategy is. Strategy is broad, long term, 'making the big decisions', 'steering the enterprise towards its ultimate objectives' and so on. Furthermore, strategy is in the hands of the senior people (because strategic decisions are, by their nature, important) who can view the, sometimes competing, needs of each part of the enterprise. It is they who tell the rest of the enterprise what to do and, hopefully, why. The bottom-up, 'emergent' perspective is very different. It is founded on the direct experience of those people who actually 'do' stuff. And these people tend to be more numerous and lower in the organisation. The bottom-up perspective is based on how we all learn from experience. Arguably, it places a greater emphasis on 'what is' rather than 'what should be'.

'Content' and 'process'

These two sets of tensions between the four perspectives of operations strategy are closely aligned with what is sometimes called the distinction between the 'content' and 'process' of operations strategy. 'Content' means the collection of decisions that are made (deliberately or by default) within the operations strategy domain. Content is concerned with the strategic decisions that shape and develop the long-term direction of the operation. It is the outcome of the reconciliation of market requirements and operations resource capabilities. The 'process' of operations strategy means the way in which operations strategies are (or can be) formulated. It is a reflection both of what operations managers should do and what they actually do in practice. It is the reconciliation of top-down and bottom-up perspectives. The distinction between content and process is illustrated in terms of the four perspectives in Figure 1.9.

However, this division between content and process, between the four perspectives is, to some extent, a simplification. The reality is that all decisions are partly a function of how they are made. But distinguishing between content and process does allow us to examine the set of issues associated with each in a logical manner. Chapters 2 to 8 of this book are concerned with issues concerning the content of operations strategy, while Chapters 9 and 10 are concerned with the operations strategy process.

Figure 1.9 The content of operations strategy reconciles the market requirements and operations resource perspectives; the process of operations strategy reconciles the top-down and bottom-up perspectives



What is the 'content' of operations strategy?

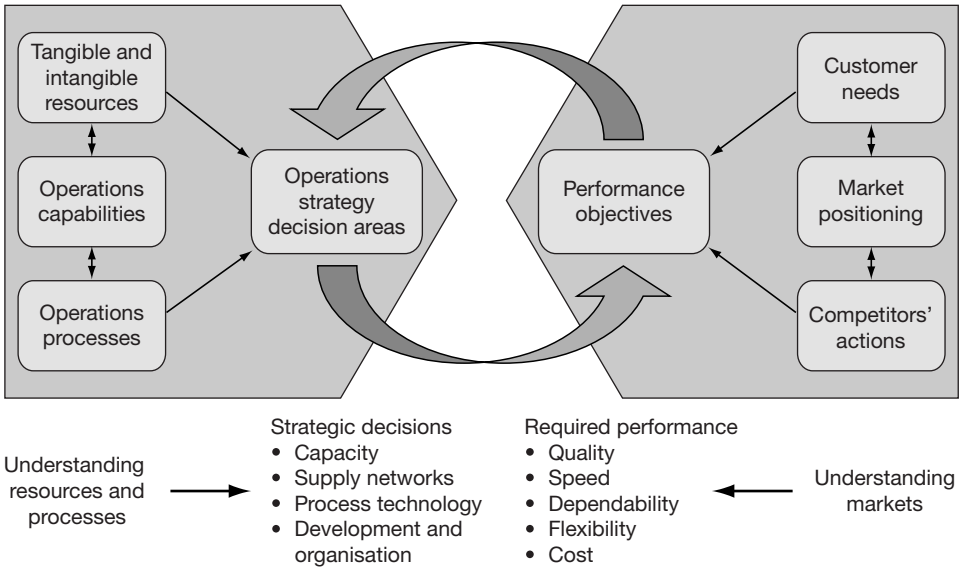
Operations strategy is concerned with the reconciliation of market requirements and operations resources. It attempts to influence the way it satisfies market requirements by setting appropriate performance objectives. It attempts to influence the capabilities of its operations resources through the decisions it takes in how those resources are deployed. So, the content of operations strategy is the interaction between the operation's performance objectives and the decisions that it takes concerning resource deployment. Figure 1.9 illustrates this idea. It particularly highlights the importance of

- understanding the relative importance of the operation's performance objectives; and
- understanding the influence on them of the decision areas that determine resource deployment.

Operations strategy performance objectives

In Figure 1.10, the market requirements perspective on operations strategy is summarised in terms of five generic performance objectives: quality, speed, dependability, flexibility and cost. Their purpose is to articulate market requirements in a way that will be useful to operations. However, before we can pursue the idea of performance objectives further, we must take a step back in order to consider market positioning and how competitive factors are used to describe positioning.

Figure 1.10 Operations strategy is the strategic reconciliation of market requirements with operations resources



A company may try to articulate its position in the market in a number of ways. It might compare itself with a competitor; for example, *'We wish to offer a wider range of products than Gap, but not be as expensive as Donna Karen.'* Alternatively, they might associate themselves with the needs of a particular customer group. For example, *'We wish to provide a level of service and attention that discerning business people expect when they stay at our hotels.'* Either way, they finish up defining market position in terms of a number of dimensions – for example, range, price, quality of service and so on. These dimensions on which a company wishes to compete are called 'competitive factors'. Different words will be used for different types of operation and their relative importance will change depending on how the company wishes to compete. Nevertheless, their common characteristic is that they describe the things that a customer can see or experience. Table 1.2 illustrates this idea for two contrasting operations. This clusters the competitive factors for each operation into the five generic performance objectives that they represent.

Note that the three operations we have used as examples in Table 1.2 have a different view of each of the performance objectives. So, for example, the mortgage service sees quality as being at least as much about the manner in which its customers relate to its service as it does about the absence of technical errors. The steel plant, on the other hand, while not ignoring quality of service, primarily emphasises product-related technical issues. The finance function, while valuing accuracy, also includes softer 'trust' and 'relationship' factors. Different operations will see quality (or any other performance objective) in different ways, and emphasise different aspects. Broadly speaking, though, they are selecting from the same pool of factors that together constitute the generic performance objective – in this case, 'quality'. So, each of the performance objectives represents a cluster of competitive factors grouped together for convenience. Sometimes operations may choose to rebundle, using slightly different headings. For example, it is not uncommon in some service operations to refer to 'quality of service' as representing

Table 1.2 Competitive factors for three operations grouped under their generic performance objectives

Performance objective	*Mortgage services – associated competitive factors include …*	*Steel plant – associated competitive factors include …*	*Finance function – associated competitive factors include …*
Quality	Professionalism of staff Friendliness of staff Accuracy of information Ability to change details in future	Percentage of products conforming to their specification Absolute specification of products Usefulness of technical advice	Accuracy of work Insightfulness of financial advice Trust and relationship with other functions
Speed	Time for call centre to respond Prompt advice response Fast loan decisions Fast availability of funds	Lead time from enquiry to quotation Lead time from order to delivery Lead time for technical advice	Responsiveness to other functions' requests Time between need for financial information and issuing it
Dependability	Reliability of original promise date Customers kept informed	Percentage of deliveries 'on time, in full' Customers kept informed of delivery dates	Financial information reliably available when needed; for example, in time for meetings
Flexibility	Customisation of terms, such as duration/life of offer Cope with changes in circumstances, such as level of demand	Range of possible sizes, gauges, coatings etc. Rate of new product introduction Ability to change quantity, composition and timing of an order	Customisation of financial reports Ability to adjust volume of work to meet deadlines
Cost	Interest rate charged Arrangement charges Insurance charges	Price of products Price of technical advice Discounts available Payment terms	Cost per transaction completed Headcount (number and cost of finance staff) Facilities (office space IT, etc.)

all the competitive factors we have listed under quality, speed and dependability. In practice, the issue is not so much one of universal definition but rather consistency within one operation, or a group of operations. At the very least it is important that individual companies have it clear in their own minds what list of generic performance objectives is appropriate to their business, what competitive factors each represents and how each competitive factor is to be defined. However, note that cost is different from the other performance objectives. While most competitive factors are clear manifestations of their performance objectives, the competitive factors of 'price' are related to the cost performance objective. So, an improvement in cost performance does not necessarily mean a reduction in the price charged to customers. Firms that achieve lower costs may choose to take some, or all, of the improvement in higher margins rather than reduce prices.

Decision areas

Also, in Figure 1.10 is a set of 'decision areas'. These are the sets of decisions needed to manage the resources of the operation. Again, different writers on operations strategy use slightly different groupings and refer to them collectively in slightly different ways,

such as 'operations policy areas', 'sub-strategies' or 'operations tasks'. We shall refer to them throughout this book as 'operations strategy decisions' or 'decision areas', and the groupings of decision areas that we shall use are as follows.

- **Capacity strategy.** This concerns how capacity and facilities in general should be configured. It includes questions such as 'What should be the overall level of capacity?', 'How many sites should the capacity be distributed across, and what size should they be?', 'Should each site be engaged in a broad mixture of activities, or should they specialise in one or two?', 'Exactly where should each site be located?', 'When should changes be made to overall capacity levels?', 'How big should each change in capacity be?' and 'How fast should capacity expansion or reduction be pursued?' Chapter 4 will deal with the decisions concerning capacity strategy.
- **Supply network strategy (including purchasing and logistics).** This concerns how operations relate to the interconnected network of other operations, including customers, customers' customers, suppliers, suppliers' suppliers and so on. All operations need to consider their position in this network, both to understand how the dynamic forces within the network will affect them, and to decide what role they wish to play in the network. Decisions here include such things as 'How much of the network do we wish to own?', 'How can we gain an understanding of our competitive position by placing it in a network context?', 'How do we predict and cope with dynamic disturbances and fluctuations within the network?', 'Should we attempt to manage the network in different ways depending on the types of market we are serving?', 'How many suppliers should we have?', 'What should be the nature of our relationship with our suppliers, purely market-based or long-term partnerships?' and 'What are the appropriate ways of managing different types of supplier relationships?' Chapter 5 deals with supply network strategy.
- **Process technology strategy** This concerns the choice and development of the systems, machines and processes that act directly or indirectly on transformed resources to convert them into finished products and services. Decisions here include such things as 'How should we characterise alternative process technology?' and 'How should we assess the consequences of choosing a particular process technology?' Chapter 6 will deal with process technology decisions.
- **Development and organisation.** This concerns the set of broad and long-term decisions governing how the operation is run on a continuing basis. Decisions here include such things as 'How do we enhance and improve the processes within the operation over time?', 'How should resources be clustered together within the business?', 'How should reporting relationships be organised between these resources?' and 'How should new product and service development be organised?' We devote two chapters to these areas. Chapter 7 will deal with the strategic improvement, and Chapter 8 will deal with product and service development.

Why these decision areas?

All these decision areas will be familiar to managers in a wide variety of operations. However, it is possible to support this intuitive list of decision areas with a slightly more rigorous approach. To do this, let us indulge in some simple ratio analysis.

Essentially, ratio analysis is an attempt to decompose a fundamental ratio of some element of performance into other ratios by inserting the same measure on the top and bottom of the resulting ratios. The idea is to split the fundamental ratio into other

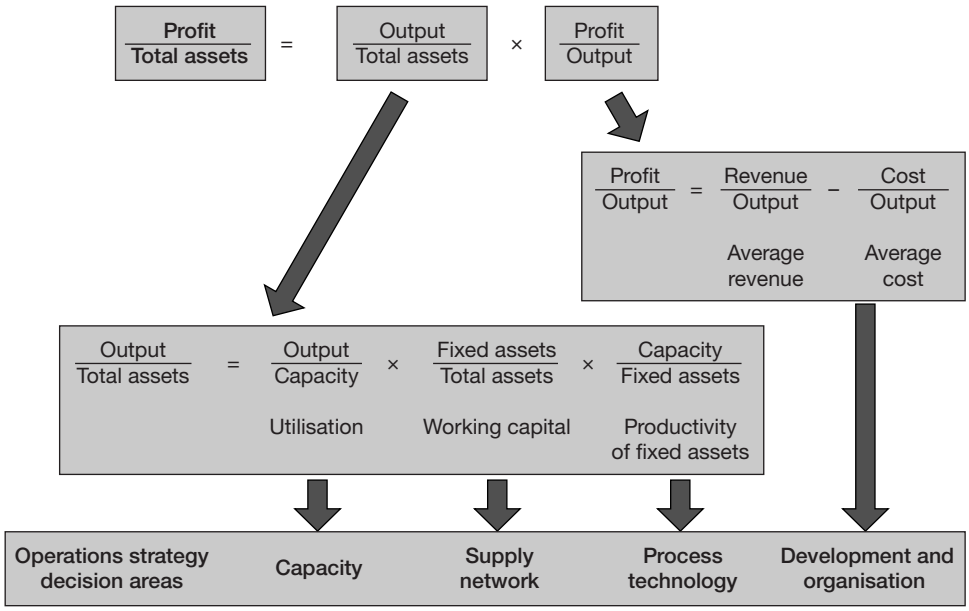
measures so that we can understand how it is built up. The best-known examples of this occur in financial accounting. Here we will do it in a slightly different way by inserting measures that have some meaning in an operations context. We are not proposing this ratio analysis as a practical analysis tool. Rather, it is intended to provide some underpinning for each decision area. Figure 1.11 shows how we can do this for the fundamental ratio of profit divided by total assets, or return on assets (ROA).

The simple ROA ratio, profit over total assets, is broken down into 'profit/output' and 'output/total assets'. This first ratio (in effect, average profit) can be further broken down into average revenue minus average cost. Operations affect the former through the ability to deliver superior levels of competitive performance (better quality, speed, dependability and flexibility). They affect the latter through the more productive use of resources (lower costs). These are the two measures that have been seen as the great operations balancing act – keeping revenue high through standards of service and competitive pricing, while keeping costs low. Both are a function of an organisation's success in achieving an effective and efficient operation through its development and organisation decisions. These decisions attempt to ensure that improvement and learning continually reduce costs, while the performance of products and services and its level of service to customers are continually increased.

The other part of the decomposed ROA ratio – output/total assets – represents the output being produced for the investment being put into the operation. It is shown in Figure 1.11 broken down into three ratios: 'output/capacity', 'fixed assets/total assets' and 'capacity/fixed assets'.

'Output/capacity', or the utilisation of the operation, is determined by the balance of demand on the operation and its long-term ability to meet that demand. To improve

Figure 1.11 Decomposing the ratio profit/total assets to derive the four strategic decision areas of operations strategy



ROA, utilisation needs to be as close to 1 as possible. To do this, either demand must be generated to match capacity, or the operation must develop an ability to adjust its capacity to match demand. This ratio is largely a function of an organisation's capacity decisions. Has it managed to balance the provision of capacity with demand (output) and can it change its capacity to meet changing levels of demand?

'Fixed assets/total assets' is a ratio partially governed by the working capital requirements of the business. The smaller the working capital required by the operation, the closer fixed assets are to total assets. For the operations function, working capital minimisation is often a matter of reducing the inventories in its supply network, a function of an organisation's supply network decisions. Can the supply network maintain appropriate delivery of its products and services without carrying excessive levels of inventory?

'Capacity/fixed assets' is sometimes called the productivity of fixed assets. It is a measure of how much the operation has had to spend in order to acquire, or develop, its capacity. To some extent this is determined by the skill of the operation's designers and technologists. An operation that achieves the required capacity levels without needing large amounts of capital expenditure will have a better ratio than the operation that has 'thrown money at the problem'. This ratio is largely a function of an organisation's process technology decisions. Has it invested wisely in appropriate process technologies, which can create a sufficient volume of appropriate products and/or services, without excessive capital expenditure?

Obviously this is not a totally clean categorisation. In some way, all the decision areas will have some impact on all the ratios. For example, a company's development and organisation strategy includes such issues as how improvement is encouraged, how the organisation's structure works and how performance is measured. This will affect many of these ratios. Its main focus, however, is likely to be on improving average profit, by reducing costs through operations efficiency and increasing revenue through improved operations effectiveness at delivering its products and services.

Table 1.3 sets out some typical decisions that need to be taken in two very different types of operation, clustered under the four areas.

Structural and infrastructural decisions

A distinction is often drawn in operations strategy between the strategic decisions that determine an operation's structure, and those that determine its infrastructure. Structural issues primarily influence the physical arrangement and configuration of the operation's resources. Infrastructural strategy areas influence the activities that take place within the operation's structure. This distinction in operations strategy has been compared to that between 'hardware' and 'software' in a computer system. The hardware of a computer sets limits to what it can do. Some computers, because of their technology and their architecture, are capable of higher performance than others, although those computers with high performance are often more expensive. In a similar way, investing in advanced process technology and building more or better facilities can raise the potential of any type of operation. But the most powerful computer can only work to its full potential if its software is capable of exploiting the potential embedded in its hardware. The same principle applies with operations. The best and most costly facilities and technology will only be effective if the operation also has an appropriate infrastructure that governs the way it will work on a day-to-day basis.

However, it is a mistake to categorise decision areas as being either entirely structural or entirely infrastructural. In reality, all the decision areas have both structural and