

Logistics Management & Strategy

Competing Through
the Supply Chain

Fourth Edition

Alan Harrison &
Remko van Hoek

Logistics Management and Strategy



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Foreword

I am delighted to introduce *Logistics Management and Strategy*, now in its fourth edition – a further aid in our ability to drive our understanding of such a critical part of the business environment. In Bausch and Lomb logistics remains a key area of management attention, given its central role in customer service and the opportunities it provides for cost control, two fundamental essentials for any global business today.

Bausch and Lomb is built on a tradition of developing state of the art Optical products – from contact lenses to cataract surgery and the fast-growing optical pharmaceutical markets. These complex supply chains cover five continents and serve varying types of customers including hospitals, opticians and multiple retailers. They involve stock-keeping units (skus) requiring temperature control, serial traceability and sterility, and make for a diverse and challenging set of logistics demands.

When you then add these challenges to a range of over 100,000 skus – with some products being offered in over 7,000 different refractive powers/pack sizes – then you can understand why utilising the very latest approaches to logistics management and strategy is absolutely crucial.

In recent years we have invested heavily in automated warehouses, such as at our site in Amsterdam, recently recognised as one of the ‘top ten’ logistics facilities in the Netherlands. We have also developed our utilisation of agile logistics. This has been addressed by reducing the number of base products produced in our 17 factories, whilst increasing our customer responsiveness through postponement of labelling, bundling, promotional artwork and language compliance. In this regard, being a member of the Agile Supply Chain Research Club at Cranfield and working with Alan has been a rewarding and beneficial experience. I note that some of our experience has been invested in Chapter 7.

In the last two years Bausch and Lomb has greatly reduced inventory holdings through a number of logistics initiatives – improving working capital whilst maintaining, and even improving, customer service levels.

But the fight goes on, and it is with texts such as *Logistics Management and Strategy* in your armoury that you can continue to drive further improvements in your supply chain. The great aspect of this text is its readability – it does not seek to lecture the reader, but imparts its wisdom in a straightforward and practical manner. Fundamentally, I believe that is the essence of the science of logistics. Every element of our complex logistical environment is captured in this book with new sections covering sustainability, planning and control, and particularly the strategic role of procurement – all adding to the rich content.

In introducing this collaboration between Alan and Remko my parentage springs to mind. This was another Anglo-Dutch partnership – albeit with different outcomes!

I have spent the last twenty-five years in logistics, working in both British and Dutch environments. The last ten of these years have been in a global role. The output of Alan's and Remko's partnership rings true in so many areas – and offer methods and approaches which will continue to drive our improvements in the coming years.

Paul Mayhew MSc, MCILT
Vice President, Global Logistics
Bausch and Lomb.

Preface

Logistics has been emerging from Peter Drucker's shadowy description as 'the economy's dark continent' for some years. From its largely military origins, logistics has accelerated into becoming one of the key business issues of the day, presenting formidable challenges for managers and occupying some of the best minds. Its relatively slow route to this exalted position can be attributed to two causes. First, logistics is a cross-functional subject. In the past, it has rightly drawn on contributions from marketing, finance, operations and corporate strategy. Within the organisation, a more appropriate description would be a *business process*, cutting across functional boundaries yet with a contribution from each. Second, logistics extends beyond the boundaries of the organisation into the supply chain. Here, it engages with the complexities of synchronising the movement of materials and information between many business processes. The *systems nature* of logistics has proved a particularly difficult lesson to learn, and individual organisations still often think that they can optimise profit conditions for themselves by exploiting their partners in the supply chain. Often they can – in the short term. But winners in one area are matched by losers in another, and the losers are unable to invest or develop the capabilities needed to keep the chain healthy in the long term. The emergence of logistics has therefore been dependent on the development of a cross-functional model of the organisation, and on an understanding of the need to integrate business processes across the supply network.

While its maturity as a discipline in its own right is still far from complete, we believe that it is time to take a current and fresh look at logistics management and strategy. Tools and concepts to enable integration of the supply chain are starting to work well. Competitive advantage in tomorrow's world will come from responding to end-customers better than competition. Logistics plays a vital role in this response, and it is this role that we seek to describe in this book.

The globalisation of logistics assumes that quality can be duplicated anywhere, that risks are relatively small, and that sustainability does not really matter. Case study 4.2 quotes an environmental activist as saying 'we are producing food in one corner of the world, packing it in another and then shipping it somewhere else. It's mad.' The reality is that 21st-century supply chains are developing very different profiles from those developed by the mindsets of ten or 20 years ago. Risk will become more important. Plans will need to be in place to prevent or mitigate the impact of financial, operational and political uncertainty. It is both environmentally and economically right to focus on sustainability. Logistics stands at the heart of this debate.

This text has a clear European foundation (its currency is the euro) and an international appeal. In line with the globalisation of logistics, we have included cases from other parts of the world than Europe – diverse though European logistics solutions are – including South Africa, the United States, Japan, China and Australia.

Accordingly, we start in Part One with the strategic role of logistics in the supply chain. We continue by developing the marketing perspective by explaining our view of ‘putting the end-customer first’. Part One finishes by exploring the concept of value and logistics costs. In Part Two, we review leveraging logistics operations in terms of their global dimensions, and of the lead-time frontier. Part Two continues by examining the challenges of coordinating manufacturing and retail processes, and the impact on logistics of just-in-time and the agile supply chain. Part Three reviews working together, first in terms of integrating the supply chain and second in terms of sourcing and supply management. Our book ends with Part Four, in which we outline the logistics future challenge.

This text is intended for MSc students on logistics courses, and as an accompanying text for open learning courses such as global MSc degrees and virtual universities. It will also be attractive as a management textbook and as recommended reading on MBA options in logistics and supply chain management.

In the second edition, we listened carefully to students and to reviewers alike and set out to build on the foundation of our initial offering. We updated much of the material while keeping the clear structure and presentation of the first edition. There were lots of new cases and we updated others. We attempted to touch on many of the exciting developments in this rapidly expanding body of knowledge, such as governance councils, the prospects for a radio frequency identification device (RFID) and the future of exchanges. The third edition retains the clarity and up-to-date content which have become hallmarks of the previous editions. This edition continues to provide further new and updated cases to illustrate developments in the subject. This time, Chapters 6, 7 and 10 have been largely reconstructed, but you will also find many improvements to other chapters resulting from our research and work with industrial partners.

The fourth edition continues to build on the foundations we have developed so far, while continuing to update the content and keep it abreast of the rapidly developing logistics body of knowledge. Many of the cases have been updated too and new ones introduced. Chapters 6 and 7 have again been largely reconstructed, and we have refocused Chapter 9 around sourcing and supply management. We have continued to develop the theme of sustainable logistics, which we classify as a competitive priority right from the start. We are grateful to Paul Mayhew of Bausch and Lomb, who has written the Foreword to this edition following the retirement of Alain Le Goff.

We hope that our book will offer support to further professional development in logistics and supply chain management, which is needed today more than ever before. In particular, we hope that it encourages you to challenge existing thinking, and to break old mindsets by creating a new and more innovative future. Transformation of supply chains is a focus for everyone in the 21st century. Since we launched this textbook in 2001, it has become a European best seller – and is popular in Australia, Singapore and South Africa. It is also developing an important following in the United States. Our book has also been launched in local language formats in Japan, Brazil, Russia, China, Poland, Mongolia and the Ukraine.

Authors' acknowledgements

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Figures

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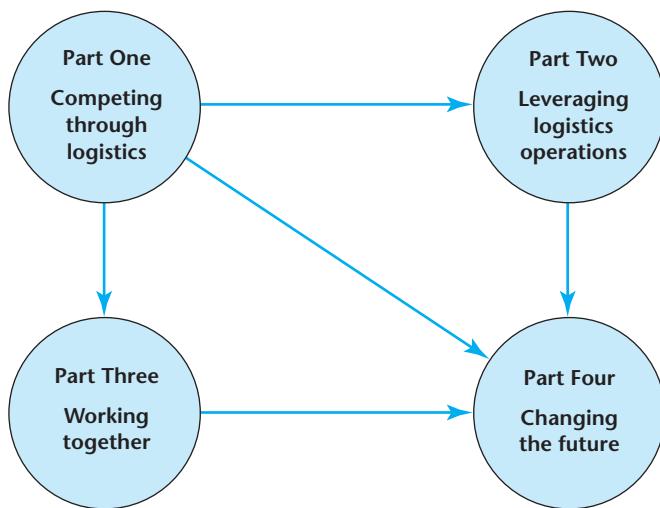
Text

Case Study 1.2 from JIT in a distribution environment, *International Journal of Logistics and Distribution Management*, Vol. 9, No. 1, pp. 32–4 (Eggleton, D.J. 1990); Case Study 1.5 from Backing the future, *Marketing* (00253650), pp. 16–17 (Barry, M. and Calver, L. 2009), Reproduced from Marketing magazine with the permission of the copyright owner, Haymarket Business Publications Limited.; Case Study 2.4 from Based on an article by John Arlide, *Sunday Times*, 26/10/2003; Case Study 2.6 from Logistics – The Missing Link in Branding: Bacalhau da Noruega vs. Bacalhau Superior, *ISL – Logistics Conference Proceedings, Lisbon* (Jahre, M. and Refsland-Fougner, A-K. 2005); Case Study 4.2 from *Sunday Times*, 20/05/2007 (Jon Ungoed-Thomas); Case Study 4.2 from www.cranfield.ac.uk/cww/perspex, Reprinted by permission of Cranfield University; Case Study 6.1 from Dr. Heather Skipworth, after an original by Dr Paul Chapman; Case Study 8.3 from *Integration of the Supply Chain: The effect of Inter-Organisational Interactions between Purchasing-Sales-Logistics*, PhD thesis, Cranfield School of Management (Aitken, J. 1998); Case Study 8.5 from Professor Huo Yanfang, Tianjin University School of Management; Case Study 8.7 from The pervasive human resource picture in interdependent supply relationships, *International Journal of Operations and Production Management*, Vol. 27, No. 1, pp. 8–27 (Koulikoff-Souviron, N. and Harrison, A. 2007)

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How to use this book

This book is divided into four parts, centred around a model for logistics. The model for logistics is introduced in the first chapter of Part One, which places logistics in terms of its contribution to competitiveness, customer service and the creation of value. Part Two of the book focuses on leveraging logistics operations within the context of quality of service and cost performance objectives. Part Three focuses on working together, and Part Four pulls together four elements of leading-edge thinking in logistics, homing in on future challenges for the subject.



The book has been arranged to take you through the subject in logical stages. The limitation of a text presentation is that the subjects are then arranged in sequence, and links between stages have to be made by the reader. We have set out to facilitate cross-linkages by including:

- *activities* at the end of many of the sections, which are aimed at helping you to think about the issues raised and how they could be applied;
- *discussion questions* at the end of each chapter to help you assess your understanding of the issues raised, and give you practice in using them;
- *case studies*, which draw together a number of issues and help you to think about how those issues are linked together in a practical setting. Use the study questions at the end of each case to guide your thinking.

We have sought continually to break up the text with figures, tables, activities and case studies, so you will rarely find two successive pages of continuous text. You should therefore regard the activities and case studies as an integral part of the method used in this book to help you to learn.

Where possible, discuss the activities and case study questions in groups after you have prepared them individually. Discussion helps to broaden the agenda and create confidence in handling the issues. While you are studying this book, think about the logistics issues it raises – in your own firm or ones that you know well, and in articles in newspapers such as the *Financial Times* and magazines such as *Business Week*. Follow up the website addresses we have included in the text and again link them with the issues raised in the book.

A few words on terminology are appropriate here. We have taken the view that logistics and supply chain management (SCM) are sufficiently different for separate definitions to be needed. We have included these definitions in Chapter 1: logistics is a subset of SCM. ‘Supply chain’ and ‘supply network’ are used interchangeably, although we favour ‘chain’ for a few organisations linked in series and ‘network’ to describe the more complex inter-linkages found in most situations. Again, our position is explained in Chapter 1.

A summary is provided at the end of each chapter to help you to check that you have understood and absorbed the main points in that chapter. If you do not follow the summary points, go back and read the relevant section again. If need be, follow up on references or suggested further reading. Summaries are also there to help you with revision.

We have designed this book to help you to start out on the logistics journey and feel confident with its issues. We hope that it will help you to improve supply chains of the future.

Plan of the book

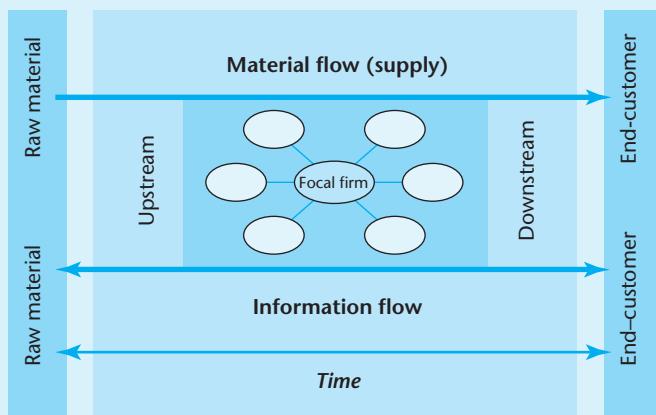
Part One COMPETING THROUGH LOGISTICS	
Chapter 1 Logistics and the supply chain	Chapter 2 Putting the end-customer first
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Part Two LEVERAGING LOGISTICS OPERATIONS	
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Part One

COMPETING THROUGH LOGISTICS

Our model of logistics structures the supply network around three main factors: the flow of materials, the flow of information and the time taken to respond to demand from source of supply. The scope of the network extends from the 'focal firm' at the centre across supplier and customer interfaces, and therefore typically stretches across functions, organisations and borders. The network is best seen as a system of interdependent processes, where actions in one part affect those of all others. The key 'initiator' of the network is end-customer demand on the right: only the end-customers are free to make up their mind when to place an order. After that, the system takes over.

Chapter 1 explains how networks are structured, the different ways in which they may choose to compete, and how their capabilities have to be aligned with the needs of the end-customer. Chapter 2 places the end-customer first in logistics thinking, and develops the theme of aligning logistics strategy with marketing strategy. Chapter 3 considers how value is created in a supply network, how logistics costs can be managed, and how a balanced measurement portfolio can be designed.



CHAPTER 1

Logistics and the supply chain

Objectives

The intended objectives of this chapter are to:

- identify and explain logistics definitions and concepts that are relevant to managing the supply chain;
- identify how supply chains compete in terms of time, cost, quality and sustainability. Also, how there are supportive capabilities and soft objectives;
- show how different supply chains may adopt different and distinctive strategies for competing in the marketplace.

By the end of this chapter you should be able to understand:

- how supply chains are structured;
- different ways in which supply chains may choose to compete in the marketplace;
- the need to align supply chain capabilities with competitive priorities.

Introduction

It only takes only 17 hours or so to assemble a car, and a couple more days are needed to ship it to the customer via the dealers. So why does it take more than a month for a manufacturer to make and deliver the car I want? And why are the products I want to buy so often unavailable on the shelf at the local supermarket? These are questions that go to the heart of logistics management and strategy. Supply chains today are slow and costly in relation to what they will be like in the future. But let us start at the beginning, by thinking about logistics and the supply chain in terms of what they are trying to do. It is easy to get bogged down in the complexities of how a supply chain actually works (and very few people actually know how a whole supply chain works). We shall address many of those details later in this book. First, let us focus on how a supply chain competes, and on what the implications are for logistics management and strategy.

The overall aim of this chapter is to provide an introduction to logistics and set the scene for the book as a whole. The need is to look outside the individual organisation and to consider how it aligns with other organisations in a given

supply chain. This is both a strategic and a managerial task: strategic, because it requires long-term decisions about how logistics will be structured and the systems it will use; managerial, because it encompasses decisions about sourcing, making and delivering products and services within an overall 'game plan'.

Key issues

This chapter addresses four key issues:

- 1 **Logistics and the supply chain:** definitions, structure, tiering.
- 2 **Material flow and information flow:** the supply chain and the demand chain.
- 3 **Competing through logistics:** competitive criteria in the marketplace.
- 4 **Logistics strategies:** aligning capabilities across the supply chain.

1.1 Logistics and the supply chain

Key issues: What is the supply chain, and how is it structured? What is the purpose of a supply chain?

Logistics is a big word for a big challenge. Let us begin by giving an example of that challenge in practice, because that is where logistics starts and ends.

CASE STUDY 1.1

Tesco

Tesco is the UK's largest food retailer, with a Group sales turnover of more than €67 billion. It has over 2,100 stores in the US, central Europe, Ireland and the Far East, and over 2,300 in the UK alone. This number has increased rapidly as Tesco entered the convenience store market with its Tesco Express store format. The product range held by the stores has grown rapidly in recent years – a larger store can hold up to 20,000 products – as Tesco broadens its presence in the 'non-food' market for electrical goods, stationery, clothing and the like. This massive range is supported by thousands of suppliers, who are expected to meet agreed service levels (correct time and quantities) by delivering to Tesco within specific time 'windows'. Volumes are impressive. In a year, some 2.1 billion cases of product are shipped from suppliers to the stores.

Mindful of its responsibilities, Tesco is the UK's market leader in the use of bio fuels and works hard to reduce its CO₂ emissions per case delivered, through initiatives including rail, barge and alternative fuels. The company also buys considerable numbers of double-deck trailers to move more cases per trip.

Tesco states that its core purpose is 'to create value for customers to earn their lifetime loyalty'. A wide product range and high on-shelf availability across that range are key enablers of that core purpose. So how do you maintain high availability of so many product lines in so many stores? This question goes to the heart of logistics management for such a vast organisation. Logistics is about material flow, and about information flow. Let us look at how Tesco deals with each of these in turn.

An early reform for supermarket operation was to have suppliers deliver to a depot rather than to every store. During the 1980s, distribution to retail stores was handled by

26 depots. These operated on a single-temperature basis, and were small and relatively inefficient. Delivery volumes to each store were also relatively low, and it was not economic to deliver to all stores each day. Goods that required temperature-controlled environments had to be carried on separate vehicles. Each product group had different ordering systems. The network of depots simply could not handle the growth in volumes and the increasingly high standards of temperature control. A new distribution strategy was needed.

Many small depots with limited temperature control facilities were replaced by Fresh Food depots which can handle many products at several temperature ranges. The opportunity is to provide a cost-effective daily delivery service to all stores. Typically, a Fresh Food depot can handle over 80 million cases per year on a 40-acre site. The warehouse building comprises 36,000 square metres divided into three temperature zones: -25°C (frozen), 1°C (chilled) and 12°C (semi-ambient). Each depot serves a group of between 48 and 335 retail stores. Delivery vehicles for Fresh Food depots use insulated trailers divided into chambers by means of movable bulkheads so they can operate at different temperatures. Deliveries are made at agreed, scheduled times. Grocery and Non-Food goods such as cans and clothing are delivered separately.

So much for the method of transporting goods from supplier through to the stores, but how much should be sent to each store? With such a huge product range today, it is impossible for the individual store to reorder across the whole range (store-based ordering). Instead, sales of each product line are tracked continuously through the till by means of electronic point of sale (EPOS) systems. As a customer's purchases are scanned through the bar code reader at the till, the sale is automatically recorded for each stock-keeping unit (sku). Cumulative sales are updated every four hours on Tesco Information Exchange (TIE). This is a system based on internet technology that allows Tesco and its suppliers to communicate trading information. The aim of improved communication is to reduce response times from manufacturer to stores and to ensure product availability on the shelf. Among other things, TIE aims to improve processes for introducing new products and promotions, and to monitor service levels.

Based on cumulative sales, Tesco places orders with its suppliers by means of electronic data interchange (EDI). As volumes and product ranges increased during the 1990s, food retailers such as Tesco aimed to de-stock their depots by ordering only what was needed to meet tomorrow's forecast sales. For fast-moving products such as types of cheese and washing powders, the aim is *day 1 for day 2*: that is, to order today what is needed for tomorrow. For fast-moving products, the aim is to *pick to zero* in the depot: no stock is left after store orders have been fulfilled. This means that the same space in the depot can be used several times over. Deliveries to stores are made in two *waves*, at specific times and within defined windows. This helps to improve product availability at stores throughout the day, and thus support changes in demand.

Updated by Joe Thomas (Tesco) 2010

Questions

- 1 Describe the key logistics processes at Tesco.
- 2 What do you think are the main logistics challenges in running the Tesco operation?

So why is Tesco growing in an intensely competitive market? It describes its core purpose as being ‘to create value for customers to earn their lifetime loyalty’. *Loyalty* is an important term that we return to in the next chapter. In order to achieve loyalty, Tesco has to understand customer needs and how they can be served. Its products must be recognised by its customers as representing outstanding value for money. To support such goals, it must ensure that the products that its customers want are available on the shelf at each of its stores at all times, day and night. Logistics is the task of planning and controlling the purchase and distribution of Tesco’s massive product range from suppliers to stores. Logistics is concerned with managing two key flows:

- *material flow* of the physical goods from suppliers through the distribution centres to stores;
- *information flow* of demand data from the end-customer back to purchasing and to suppliers, and supply data from suppliers to the retailer, so that material flow can be accurately planned and controlled.

The logistics task of managing material flow and information flow is a key part of the overall task of *supply chain management*. Supply chain management is concerned with managing the entire chain of processes, including raw material supply, manufacture, packaging and distribution to the end-customer. The Tesco UK supply chain structure comprises three main functions:

- *distribution*: the operations and support task of managing Tesco’s distribution centres (DCs), and the distribution of products from the DCs to the associated stores;
- *network and capacity planning*: the task of planning and implementing sufficient capacity in the supply chain to ensure that the right products can be procured in the right quantities now and in the future;
- *supply chain development*: the task of improving Tesco’s supply chain so that its processes are stable and in control, that it is efficient, and that it is correctly structured to meet the logistics needs of material flow and information flow.

Thus logistics can be seen as part of the overall supply chain challenge. While the terms ‘logistics’ and ‘supply chain management’ are often used interchangeably, logistics is actually a subset of supply chain management. It is time for some definitions.

1.1.1 Definitions and concepts

A supply chain as a whole ranges from basic commodities (what is in the ground, sea or air) to selling the final product to the end-customer, to recycling the used product. Material flows from raw materials (such as a bauxite mine as a source of aluminium ore) to the finished product (such as a can of cola). The can is recycled after use. The analogy to the flow of water in a river is often used to describe organisations near the source as *upstream*, and those near the end-customer as *downstream*. We refer to firms that are involved in supply chains as partners, because that is what they are. There is a collective as well as an individual role to play in

the conversion of basic commodity into finished product. At each stage of the conversion, there may be *returns* which could be reject material from the preceding firm, or waste such as the finished can that needs to be recycled. Sometimes, the whole product is wasted because the consumer throws it away.

A supply chain is a network of partners who collectively convert a basic commodity (upstream) into a finished product (downstream) that is valued by end-customers, and who manage returns at each stage.

Each partner in a supply chain is responsible directly for a process that *adds value* to a product. A process:

Transforms *inputs* in the form of materials and information into *outputs* in the form of goods and services.

In the case of the cola can, partners carry out processes such as mining, transportation, refining and hot rolling. The cola can has *greater value* than the bauxite (per kilogram of aluminium).

Supply chain management (SCM) involves *planning and controlling* all of the processes from raw material production to purchase by the end-user to recycling of the used cans. Planning refers to making a plan that defines how much of each product should be bought, made, distributed and sold each day, week or month. Controlling means keeping to plan – in spite of the many problems that may get in the way. The aim is to coordinate planning and control of each process so that the needs of the end-customer are met correctly. The definition of SCM used in this book is adapted from the Council of SCM Professionals (CSCMP, 2010):

SCM encompasses the planning and controlling of all processes involved in procurement, conversion, transportation and distribution across a supply chain. SCM includes coordination and collaboration between partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, SCM integrates supply and demand management within and between companies in order to serve the needs of the end-customer.

'Serve the needs of the end-customer' has different implications in different contexts. In not-for-profit environments, such as public health and local government, serving implies 'continuously improving', 'better than other regions/countries', 'best value' and the like. In the commercial sector, serving implies 'better than competition', 'better value for money' and so on. In either situation, the focus of managing the supply chain as a whole is on *integrating* the processes of supply chain partners, of which the end-customer is the key one. In effect, the end-customer starts the whole process by buying finished products. It is the buying behaviour of the end-customer that causes materials to flow through the supply chain.

The degree to which the end-customer is satisfied with the finished product depends crucially on the management of material flow and information flow along the supply chain. If delivery is late, or the product has bits missing, the whole supply chain is at risk from competitors who can perform the logistics task better. Logistics is a vital enabler for supply chain management. We use the following definition of logistics in this book:

The task of coordinating material flow and information flow across the supply chain to meet end-customer needs.

Logistics has both *strategic* (long-term planning) and *managerial* (short- and medium-term planning and control) aspects. Tesco has a clear view about the opportunities here. A breakdown of costs in Tesco's part of the UK supply chain is as follows:

- Supplier delivery to Tesco distribution centre (DC) 18%
- Tesco DC operations and deliver to store 28%
- Store replenishment 46%
- Supplier replenishment systems 8%

Nearly half of supply chain costs are incurred in-store. In order to reduce these in-store costs, Tesco realises that the solution is 'to spend more upstream and downstream to secure viable trade-offs for in-store replenishment'. If a product is not available on the shelf, the sale is potentially lost. By integrating external manufacturing and distribution processes with its own, Tesco seeks to serve the needs of its customers better than its competitors.

1.1.2 Supply chain: structure and tiering

The concept of a supply chain suggests a series of processes linked together to form a chain. A typical Tesco supply chain is formed from five such links.

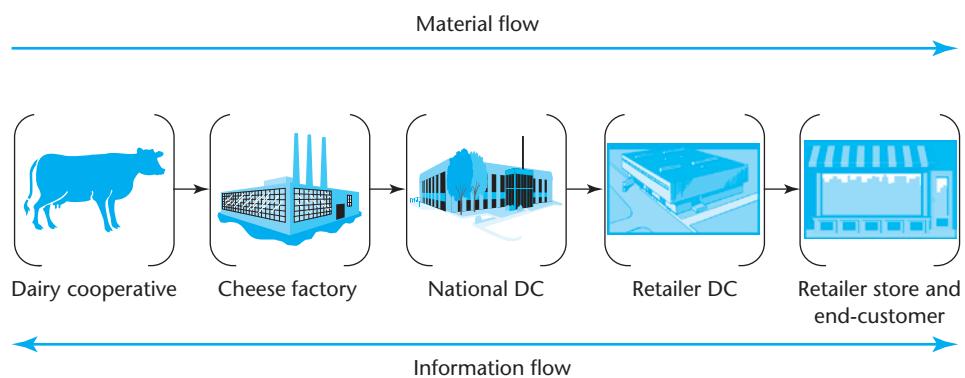


Figure 1.1 From cow to customer

In Figure 1.1 milk is produced by a dairy cooperative and shipped to a cheese factory. Once made, the cheese is shipped to the manufacturer's national distribution centre (NDC), where it is stored and matured for nine months. It can then be shipped in response to an order from the retailer, and is transported first to the retailer's regional distribution centre (RDC). From there, it is shipped to the store. Looking at the arrows in Figure 1.1, material flows from left to right. Information is shared across the chain: it is demand from the end-customer that makes the whole chain work.

If we look more closely at what happens in practice, the term 'supply chain' is somewhat misleading in that the 'chain' represents a simple series of links between a basic commodity (milk in this case) and a final product (cheese). Thus the

cheese manufacturer will need packaging materials such as film, labels and cases. Cheese requires materials additional to milk in the manufacturing process. So the manufacturer deals with suppliers other than the milk cooperative alone. Once made, the cheese is dispatched for maturation to the supplier's NDC, and then dispatched to many customers in addition to Tesco. Once at a Tesco RDC, the 'chain' spreads again because up to 100 stores are served by a given RDC. The additional complexity prompts many authors to refer to *supply networks* rather than supply chains, a point we return to shortly. Logistics today is also concerned with what happens *after* a product has been sold. Two major concerns are:

- *Reverse logistics*: the return of unwanted goods and packaging in the opposite direction (from right to left) to the normal flow shown in Figure 1.1.
- *Waste*: the discarding of product at any stage in the supply chain due to quality problems – for example, the disposal of out-of-date or damaged stock by a retailer or by an end-customer. We consider waste more generally in Chapter 6.

A more realistic representation of the supply chain is shown in Figure 1.2, where each link can connect with several others. A *focal firm* is shown at the centre of many possible connections with other supplier and customer companies.

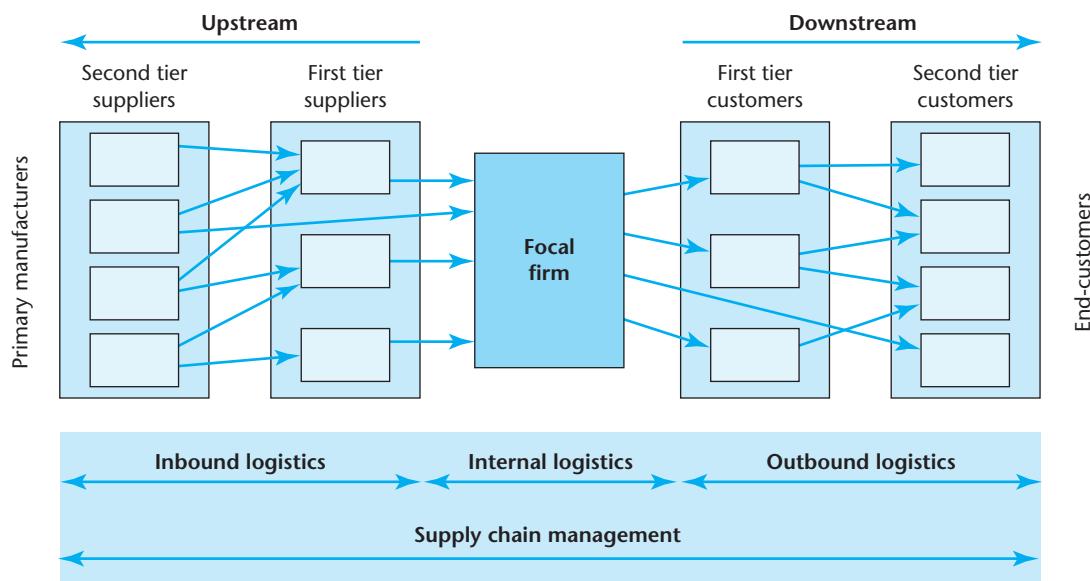


Figure 1.2 Supply network

(Source: After Slack *et al.*, 1997)

The supply chain can be seen in this diagram as a number of processes that extend across organisational boundaries. The focal firm is embedded within the chain, and its internal processes must coordinate with others that are part of the same chain. Materials flow from left (upstream) to right (downstream). If everything is as orderly as it seems, then only the end-customer (to the extreme right of the chain) is free to place orders when he or she likes: after that, the system takes over.

The supply chain is *tiered*, in that supply side and demand side can be organised into groups of partners with which we deal. Thus if we place an assembler such as the Ford plant at Valencia as the focal firm, *inbound logistics* comprises tier 1 suppliers of major parts and subassemblies that deliver directly to Ford, while tier 2 suppliers deliver to the tier 1s and so on. *Outbound logistics* covers the supply by the Ford Valencia plant to national sales companies as tier 1 customers, which in turn supply to main dealers at tier 2 and so on. *Internal logistics* covers the planning and control of parts movements within the Ford Valencia plant. The ultimate aim of supply chain management is to *integrate* inbound, outbound and internal logistics into a seamless whole, focused on meeting end-customer needs with no waste.

Other terms that are used to describe aspects of managing the supply chain are:

- *Purchasing and supply* deals with a focal firm's immediate suppliers (upstream).
- *Physical distribution* deals with the task of distributing products to tier 1 customers (downstream).
- *Logistics* refers to management of materials and information. *Inbound logistics* deals with links between the focal firm and its upstream suppliers, while *outbound logistics* refers to the links between the focal firm and its downstream customers. *Internal logistics* deals with planning and control of material flow within the boundaries of the focal firm.

Supply chain management thus appears as the 'end to end' (or 'cow to customer' as we have expressed it in Figure 1.1) management of the network as a whole, and of the relationships between the various links. The essential points were summarised long ago by Oliver and Webber (1982):

- Supply chain management views the supply chain as a *single entity*.
- It demands *strategic decision making*.
- It views *balancing inventories* as a last resort.
- It demands *system integration*.

A natural extension of this thinking is that supply chains should rather be viewed as *networks*. Figure 1.3 shows how a focal firm can be seen at the centre of a network of upstream and downstream organisations.

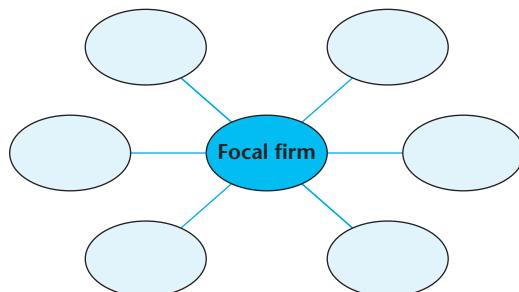


Figure 1.3 A network of organisations

The terms 'supply chain' and 'supply network' both attempt to describe the way in which buyers and suppliers are linked together to serve the end-customer.

'Network' describes a more complex structure, where organisations can be cross-linked and there are two-way exchanges between them; 'chain' describes a simpler, sequential set of links (Harland *et al.*, 2001). We have used the terms interchangeably in this book, preferring 'chain' to describe simpler sequences of a few organisations and 'network' where there are many organisations linked in a more complex way.

Figure 1.3 takes a basic view of the network, with a focal firm linked to three upstream suppliers and three downstream customers. If we then add material flow and information flow to this basic model, and place a boundary around the network, Figure 1.4 shows the network in context. Here we have added arrows showing the logistics contribution of material and information flows, together with the time dimension. Material flows from primary manufacture (for example, farming, mining or forestry) through various stages of the network to the end-customer. Material flow represents the *supply* of product through the network in response to demand from the next (succeeding) organisation. Information flow broadcasts *demand* from the end-customer to preceding organisations in the network. The time dimension addresses the question 'How long does it take to get from primary source to the end-customer?' That is, how long does it take to get the product through the various stages from one end of the supply chain to the other? Time is important because it measures how quickly a given network can respond to demand from the end-customer. In fact, the concept of flow is based on time:

Flow measures the quantity of material (measured in input terms such as numbers of components, tonnes and litres) that passes through a given network per unit of time.

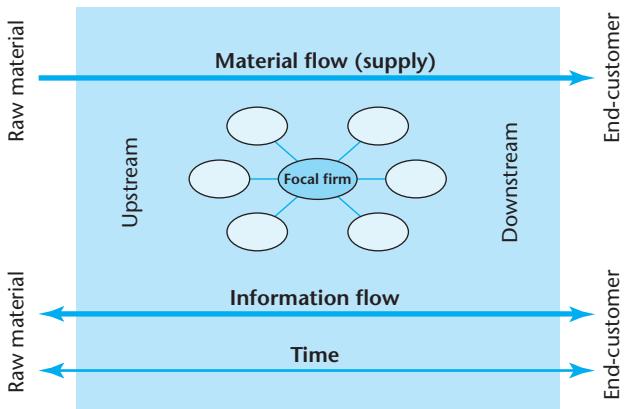


Figure 1.4 The network in context

Activity 1.1

Figure 1.5 shows an example network map of a chocolate bar. Draw a network map showing how your organisation, or one that you know well, links with other organisations. Explain the upstream, downstream and internal processes as far as you can. We expect you to address at least the first tiers of demand and supply. You will derive further benefit from researching additional tiers, and by developing the linkage of relationships that is involved. Explain how these work in practice, and how materials flow between the different tiers.

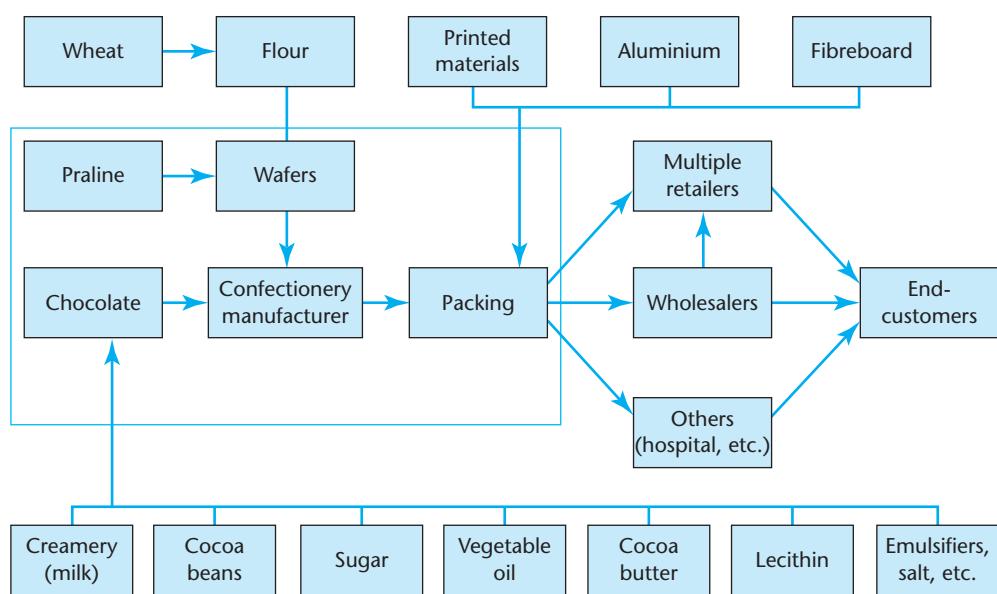


Figure 1.5 Example of a confectionery network map

(Source: After Zheng *et al.*, 1998)

An important point here is that the supply network should be viewed as a *system*. All processes within the network need to be understood in terms of how they interact with other processes. No organisation is an island: its inputs and outputs are affected by the behaviour of other players in the network. One powerful, disruptive player can make life very difficult for everyone else. For example, several auto assemblers optimise their own processes, but disrupt those of upstream suppliers and downstream distributors. The effect is to increase total system costs *and* reduce responsiveness to end-customer demand.

1.2 Material flow and information flow

Key issue: What is the relationship between material flow and information flow?

As we have already seen, logistics is about managing material flow and information flow. In this section, we examine material flow and information flow in more detail.

1.2.1 Material flow

The aim within a supply chain is to keep materials flowing from source to end-customer. The time dimension in Figure 1.4 suggests that parts are moved through the supply chain as quickly as possible. In order to prevent local

build-ups of inventory, flow must be orchestrated so that parts movement is co-ordinated. The term often used is *synchronous*. Caterpillar Inc. makes complex earth-moving equipment, and there are literally thousands of component parts and subassemblies that must come together in the final assembly processes. The vision is that parts and subassemblies should flow continuously through the supply chain, all orchestrated like a ballet (Knill, 1992: 54):

The goal is continuous, synchronous flow. *Continuous* means no interruptions, no dropping the ball, no unnecessary accumulations of inventory. And *synchronous* means that it all runs like a ballet. Parts and components are delivered on time, in the proper sequence, exactly to the point they're needed.

Often it is difficult to see the 'end to end' nature of flow in a given supply chain. The negative effects of such difficulty include build-ups of inventory and sluggish response to end-customer demand. And sheer greed by the most powerful members of a supply chain often means that it is weaker partners (notably small to medium-sized enterprises – SMEs) who end up holding the inventories. So management strategies for the supply chain require a more holistic look at the links, and an understanding that organisational boundaries easily create barriers to flow.

Case study 1.2 describes how one company – Xerox in this case – re-engineered material flow in its distribution system.

CASE STUDY 1.2

Xerox

Once the problems of introducing 'just-in-time' production systems (internal logistics) had been solved at the Xerox plant making photocopiers at Venray in Holland, attention shifted towards the finished product inventory (outbound logistics). Historically, stocks of finished products had been 'managed' by trying to turn the sales 'tap' on or off as stocks developed. This was characterised by the familiar 'feast or famine' situations. The objective of the next move for Xerox became clear: making only what you need when you need it, then shipping direct to the customer. But the key question had to be answered: just-in-time for what? The answer is – the end-customer. And customer surveys showed that three types of delivery were needed:

- Commodity products should be delivered 'off the shelf'.
- Middle-range products were required in five days.
- Larger products that had to be integrated into existing customer processes and systems had to be planned months ahead, but the quoted delivery date had to be met 100 per cent.

It was envisaged that this would lead to a radically different inventory 'profile' in the supply chain. Figure 1.6 shows a traditional inventory profile on the left. Most of the stock was held in local depots waiting for customer orders. If the mix had been incorrectly forecast, too many of the wrong products were in plentiful supply, while needed products were unavailable. Further, a batch of replacement products would take a long time to fight their way through the pipeline. A new 'just-in-time' strategy was conceived to make the supply chain much more responsive. This strategy had a profound effect on the inventory profile, pushing much of the inventory upstream. The closer that inventory

is located towards the end-customer, the higher the value added – and the more that it is committed to a given finished product specification. Instead, inventory was mostly held further upstream. This was a more flexible solution, where product could be finally assembled to known orders, and where it had lower value. Of course, it has since been possible to remove several stages of the distribution process, thereby eliminating some of the sources of inventory altogether.

For commodity products, Xerox coined the term *deliver JIT*: that is, the product had to be delivered out of stock. Where sales forecasts are traditionally poor, the challenge was one of flexibility, simplicity and speed of manufacture. For mid-range products, it was unrealistic to hold ‘just-in-case’ inventories of products that are too complex to be assembled quickly. Instead, *finish JIT* was the term coined to describe the new policy of building semi-finished products with the minimum of added value, consistent with being able to complete and deliver the product in the five-day target. Finally, *build JIT* was the term used to describe the new philosophy of building larger products quickly within a defined lead time.

The impact of the new build philosophies on the downstream supply chain processes can be judged from Figure 1.6. While the traditional inventory profile shows a maximum number of days of stock (shown in the shaded area) at finished product level, this is risky. It always seems that demand is greatest for the very items that are not available! *Postponing* the decision on exact specification until as late as possible in the process, when we are more likely to know precisely what the end-customer wants, helps to create the much flattened inventory profile to the right of the diagram. These are issues to which we return in Chapter 6. (A development of this case, tracking ‘what happened next’, is Case study 7.4.)

(Source: After Eggleton, 1990)



Notes: WIP = work in progress, i.e. products being worked on, but not yet ready for sale.
Shaded areas indicate days of stock: the wider the area, the more days of stock in that position.

Figure 1.6 Xerox: the impact on inventories

Question

- How did inventory reduction in the supply chain lead to improved competitiveness at Xerox?

1.2.2 Information flow

As asked in the Xerox case study, just-in-time *for what*? It is all well and good to get materials flowing and movements synchronised, but the ‘supply orchestra’ needs to respond in unison to a specific ‘conductor’. The ‘conductor’ in this analogy is actually the end-customer, and it is the end-customer’s demand signals that trigger the supply chain to respond. By sharing the end-customer demand information across the supply chain, we create a *demand chain*, directed at providing enhanced customer value. Information technology enables the rapid sharing of demand and supply data at increasing levels of detail and sophistication. The aim is to integrate such demand and supply data so that an increasingly accurate picture is obtained about the nature of business processes, markets and end-customers. Such integration provides increasing competitive advantage, as we explore further in Chapter 8.

The greatest opportunities for meeting demand in the marketplace with a maximum of dependability and a minimum of inventory come from implementing such integration across the supply chain. A focal firm cannot become ‘world class’ by itself!

Figure 1.7 gives a conceptual model of how supply chain processes (source, make, deliver) are integrated together in order to meet end-customer demand (based on SCOR, 2010). Demand planning information (‘plan’) is shared across the chain rather than being interpreted and then changed by the ‘sell’ process next to the market. Demand fulfilment is also envisaged as an integrated process, as materials are moved from one process to the next in a seamless flow. Information is the ‘glue’ that binds supply chain processes together, and which coordinates planning and fulfilment. (We explain the SCOR model in more detail in section 3.5.)

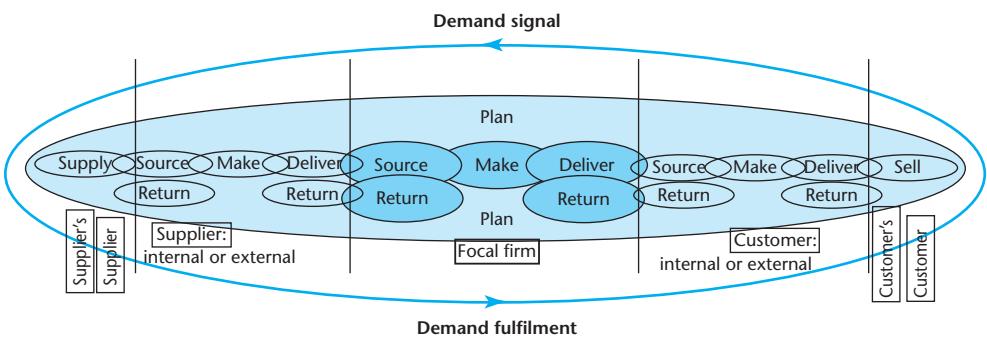


Figure 1.7 Integrating demand and supply chains

Activity 1.2

Write a brief (200 words) appraisal of material and information flow in the supply network affecting one of the major products in the response you gave in Activity 1.1. Perhaps the current situation is different from the above ideals?

1.3 Competing through logistics

Key issues: How do products win orders in the marketplace? How does logistics contribute to competitive advantage?

There are many potentially conflicting demands on an organisation today. All those unreasonable customers seem to want it yesterday, at lower prices and to be compensated if it goes wrong! Within a given supply chain, it is important that each organisation understands how each group of products competes in the marketplace, and that it aligns its capabilities with those of its partners.

A 'product' is actually a combination of the *physical product* (for example, a 200g pack of Camembert cheese) and its accompanying *service* (for example, how it is merchandised in the store – easy to find, always available, attractive presentation, lighting, temperature). While the physical product is determined by marketing and research and development (R&D), service is heavily influenced by logistics.

It is impossible to be outstanding at everything, and supply chain partners need to give priority to capabilities that give each product group its competitive edge. These are the advantages where supply chain partners 'dig in deep' by giving priority to investment and training, and by focusing product development and marketing efforts. They need only to match industry average performance on other criteria. Let us now look at the competitive priorities that can be delivered by logistics in the supply chain.

There are various ways in which products compete in the marketplace. Perhaps a given product is something that no one else can match in terms of price. Or maybe you offer a product that is technically superior, such as Gillette razors. While new product development has logistics implications, the key advantage provided by logistics – as suggested in Case study 1.1 about Tesco – is *availability of conforming product in the marketplace at low cost*. Logistics supports competitiveness of the supply chain as a whole by:

meeting end-customer demand through supplying what is needed in the form it is needed, when it is needed, at a competitive cost.

Logistics advantage thus shows up in the form of such competitive factors as better product availability in the marketplace and low product obsolescence. Defining logistics advantage means that we need to set goals that are clear, measurable and quantifiable. We distinguish three 'hard objectives' for creating logistics advantage: *quality, time and cost*. There are three further important ways of creating logistics advantage: *controlling variability* in logistics processes, *dealing with uncertainty* and *sustainability*. We have called these 'supportive capabilities', and they can be just as important as hard objectives. Finally, there are 'soft objectives', which relate to service aspects such as the confidence customers develop in the way the logistics operation is performed. Let us look at each of these ways of creating advantage in turn.

1.3.1 Hard objectives

Traditional ways of competing are to offer the end-customer advantages related to product quality, the speed with which it is delivered, and/or the price at which it is offered. We refer to quality, time and cost as 'hard objectives' because they are easy to measure and relatively obvious to the end-customer.

The quality advantage

The most fundamental objective – in that it is a foundation for the others – is to carry out all processes across the supply chain so that the end product does what it is supposed to do. Quality is the most visible aspect of supply chain performance. Defects, incorrect quantities and wrong items delivered are symptoms of quality problems in supply chain processes that are all too apparent to the end-customer. Such problems negatively influence customer loyalty. Robust processes are at the heart of supply chain performance. Internally, robust processes help to reduce costs by eliminating errors, and help to increase dependability by making processes more certain. When quality was positioned second to sales growth and cost, even the iconic Toyota Motor Company's brand suffered – as a string of recalls and safety concerns in recent years has shown (see, for example, Cole, 2010).

While conformance quality in the factory may be controlled to defect levels that are below 25 parts per million (ppm), a product may end up on the retailer's shelf with between 2 and 5 per cent defects, which is 10,000 to 20,000 ppm. This huge escalation takes place as the result of cumulative problems in successive supply chain processes. Cases may be crushed when shrink-wrapped at the manufacturer's NDC. In the back of the retail store, cases may be cut open with a sharp knife – despite instructions to the contrary. The end-customer sees the product on the retail shelf at its *worst* state of quality performance, and that is where the buying decision is made that drives the supply chain as a whole.

In many logistics situations, 'quality of service' is concerned with selecting the right quantity of the right product in the right sequence in response to customer orders. For example, store orders must be picked from a range of thousands of skus (stock keeping units) at a Tesco RDC. This must be carried out accurately (correct sku, correct quantity) against tight delivery schedules day in and day out. *Pick accuracy* (for example, 99.5 per cent correct sku and correct quantity) is widely used to measure the quality of this operation. And increasing requirements for in-store efficiencies mean that categories of product (for example, shampoos and toothpastes) need to be picked in a set sequence to facilitate direct-to-shelf delivery at the store. Logistics service providers who can implement and maintain the highest standards of service quality place themselves at an advantage over those who cannot.

The time advantage

Time measures how long a customer has to wait in order to receive a given product or service. Volkswagen calls this time the *customer to customer* lead time: that

is, the time it takes from the moment a customer places an order to the moment that customer receives the car he or she specified. Such lead times can vary from zero (the product is immediately available, such as goods on a supermarket shelf) to months or years (such as the construction of a new building). Competing on time is about survival of the fastest!

Time can be used to win orders by companies who have learned that some customers do not want to wait – and are prepared to pay a premium to get what they want quickly. An example is Vision Express, which offers prescription spectacles ‘in about one hour’. Technicians machine lenses from blanks on the premises. Staff are given incentives to maintain a 95 per cent service level against the one-hour target. Vision Express has been successful in the marketplace by re-engineering the supply chain so that parts and information can flow rapidly from one process to the next. Compare this with other opticians in the high street, who must send customer orders to a central factory. Under the ‘remote factory’ system, orders typically take about ten days to process. An individual customer order is first dispatched to the factory. It then has to join a queue with orders from all the other high street branches around the country. Once the order has been processed, it must return to the branch that raised the order. While this may be cheaper to do (a central, highly productive factory serves all of the branches), it takes much longer to process an order.

The time advantage is variously described as *speed* or *responsiveness* in practice. Speeding up supply chain processes may help to improve freshness of the end product, or to reduce the risk of obsolete or over-aged stock in the system. Time is an *absolute* measure, that is, it is not open to interpretation as quality and cost are. By following a product through a supply chain, we can discover which processes add value and which add time and cost but no value. We explore this further in Chapter 5, which is about managing time for advantage in the supply chain.

The cost advantage

Cost is important for all supply chain processes – that goes without saying. Low costs translate into advantages in the marketplace in terms of low prices or high margins, or a bit of each. Many products compete specifically on the basis of low price. This is supported from a supply chain point of view by low cost manufacture, distribution, servicing and the like. Examples of products that compete on low price are ‘own brand’ supermarket goods that reduce the high margins and heavy advertising spend of major brands. They also perhaps cut some of the corners in terms of product specification in the hope that the customer will consider low price to be more important than minor differences in product quality.

The pressure to reduce prices at automotive component suppliers, and hence costs to the assemblers, is intense. The assemblers have been setting annual price reduction targets for their inbound supply chains for some years. Toyota announced demands for a 30 per cent reduction in prices on many components by the time that new models are launched in 2013. But unless a supplier can match reduced prices at which products are being sold by means of reduced costs, that supplier will gradually go out of business. As a result, many suppliers are cynical about the ‘price down’ policies of the assemblers. Reduced prices are the reward

of cost cutting, and that is most often a collaborative effort by several partners in the supply chain. So suppliers are unlikely to meet Toyota's demands on their own: 'Toyota is going to have to do a lot of work itself, by switching more quickly to global platforms and using more common parts' (Soble, 2009). As indicated in section 1.1, Tesco can make only limited inroads into its in-store costs without the help of its supply chain partners.

1.3.2 Supportive capabilities

While the hard objectives listed above are always important to competitive advantage, supportive capabilities can also be key to creating logistics advantage in the marketplace. When there is little to choose in terms of quality, time or cost, supportive capabilities can make all the difference to the end-customer. Variability refers to real and identifiable differences within a population, such as the differences in time each patient at an optician has to wait for his or her eyes to be tested. Uncertainty refers to our lack of knowledge (Thompson, 2002): in logistics terms, uncertainty results in us having to deal with events that are not known in advance. Sustainability addresses the improvement of social and environmental issues in the design of logistics systems.

Controlling variability: the dependability advantage

Time is not just about speed. Quality is not just about meeting defect targets. Behind both 'hard' objectives is the need to *control variability* in logistics processes. Variability undermines the *dependability* with which a product or service meets target. While Vision Express offers a one-hour service for prescription glasses, the 95 per cent service level is a measure of the dependability of that service against the one-hour target. Firms who do not offer instantaneous availability need to tell the customer – in other words to 'promise' – *when* the product or service will be delivered. Delivery dependability measures how successful the firm has been in meeting those promises. For example, the UK's Royal Mail quality of service target for letters posted with a 'first class' stamp is that 93.0 per cent will arrive the next working day (Royal Mail, 2009). It is important to measure dependability in the same 'end to end' way that speed is measured. Dependability measures are widely used in industries such as train and air travel services to monitor how well published timetables are met. And in manufacturing firms, dependability is used to monitor a supplier's performance in such terms as:

- *on time* (percentage of orders delivered on time and the variability against target);
- *in full* (percentage of orders delivered complete and the variability against target);
- *on quality* (percentage of defects and the variability against target).

So logistics is concerned not just with the *average* percentage of orders delivered on time but also with the *variability*. For example, a manufacturer has to cope with the day-to-day variability of orders placed. In practice, this is more important than the average orders placed because of the resource implications of demand variability. Case study 1.3 explores the impact of variability on a supplier's processes.

**CASE STUDY
1.3**

Measuring schedule variability

A problem that is all too familiar to suppliers in the automotive industry is that of schedule variability. A vehicle manufacturer issues delivery schedules to specify how many parts of each type are required each day for the following month. And each day a 'call-off' quantity is issued, which specifies how many the vehicle manufacturer actually wants. The two sets of figures are not necessarily the same, although they usually add up to the same cumulative numbers for the month as a whole. In other words, the total scheduled quantities and the total call-off quantities are the same. So what is the problem?

The problem is that the supplier has to cope with the variability of call-off quantities that create huge problems for the supplier's process. Let scheduled demand = S , and call-off quantity = A . Then the difference D between schedule and actual is given by $D = S - A$. If the supplier produces to schedule, then $S > A$, the supplier will over-produce the part and end up with excess stock. Where $S < A$, the effects could either be a reduction in stock held by the supplier, or a shortfall of $(S - A)$ of parts from the supplier. The two conditions ($S > A$ and $S < A$) therefore have different logistics implications.

Figure 1.8 shows that actual demand, totalled across four different parts at PressCo (a supplier of pressed metal components), may be up to 1,600 units above schedule, or 2,200 below schedule in the case of vehicle assembler WestCo. This range has been divided up into intervals of 100 units. The mode (0 – 99) indicates that $S = A$ for a frequency of 18 per cent of the observations.

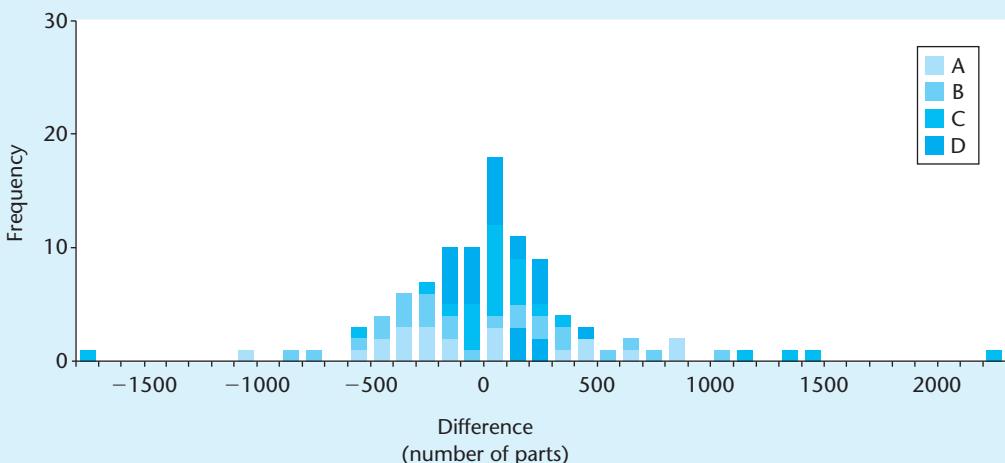


Figure 1.8 Distribution of differences between scheduled and actual demand for WestCo

Assuming that the distribution is roughly normal, the standard deviation (SD) is 573, which is characteristic of the flat, wide spread of data. Figure 1.9 shows the distribution of $S - A$ for four similar parts from the same supplier but to a different vehicle assembler; EastCo. This time, the SD for the distribution is 95, representing a much narrower spread of differences than for WestCo.

(Source: Harrison, 1996)

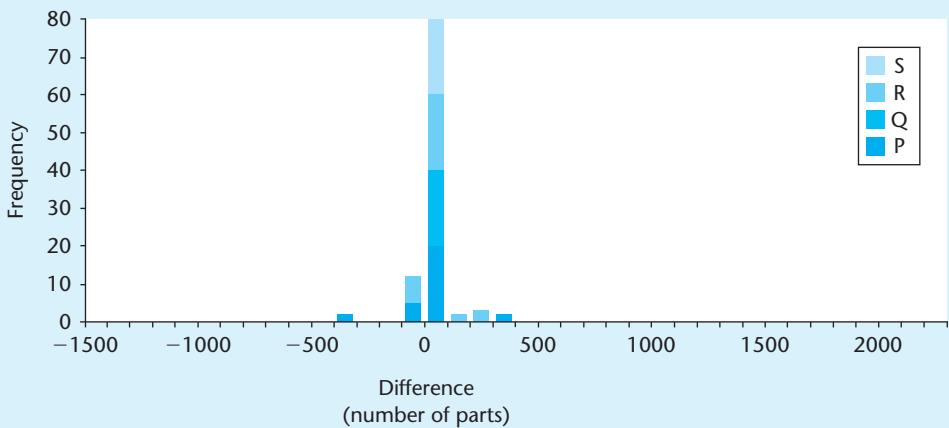


Figure 1.9 Distribution of differences between scheduled and actual demand for EastCo

Questions

- 1 What are the logistics implications to PressCo for delivery reliability to customers WestCo and EastCo?
- 2 What steps will the supplier need to take in order to satisfy call-off orders from WestCo?
- 3 If separate parts of the PressCo factory were dedicated to production for WestCo and for EastCo, which would be the more efficient in terms of labour costs and inventory holding?

Quality is not just about meeting target pick accuracy or target defect levels. It is also about controlling variability. The same argument can be made about costs. The implication of dependability for logistics is that supply chain processes need to be robust and predictable. In Chapter 6 we develop the case for dependability in supply chains under the themes of planning and control and lean thinking.

Dealing with uncertainty: the agility advantage

Dealing with uncertainty means responding rapidly to unknown problems that affect logistics processes. Sometimes, problems can be foreseen – even if their timing cannot. Toyota UK manages inbound deliveries of parts from suppliers in southern Europe by a process called *chain logistics*. Trailers of parts are moved in four-hour cycles, after which they are exchanged for the returning empty trailer on its way back from the UK. One hitch in this highly orchestrated process means that incoming parts do not arrive just-in-time at the assembly plant. Toyota demands that its suppliers and logistics partner plan *countermeasures*. This means that alternative routes for suppliers to deliver to its Burnaston assembly plant in the UK have been planned in advance to deal, for example, with a French channel ferry strike at Calais. The weather is also a cause of uncertainty in logistics – for example, it may mean that Tesco has to switch between salads and soups as the result of a cold snap. Other forms of uncertainty concern events where neither the problem nor its timing can be foreseen. Case study 1.4 provides an example of such an event and how two organisations responded differently to it.

**CASE STUDY
1.4**

Nokia deals with uncertainty

In March, 2000, a thunderstorm struck the Philips semiconductor plant at Albuquerque in New Mexico, which made silicon chips for products such as mobile phones. Damage at first seemed minor, and firefighters soon left the premises. At first, Philips told major customers such as Nokia and Ericsson that the delay to production would only be one week. But damage to some of the clean areas in the plant – created by smoke and water – was actually going to take months to remedy. Clean rooms in semiconductor plants must be spotless, and particles of more than 0.5μ are filtered out.

The one-week delay was quickly reported by Tapio Markki, Nokia's chief component-purchasing manager, to Pertti Korhonen, Nokia's top troubleshooter. 'We encourage bad news to travel fast', said Mr Korhonen. While Philips initially rejected offers of help from Nokia, it soon became apparent that production delays would be much more than one week. Korhonen put together a team to find solutions to supplying the five chips that were affected by the Philips fire. Three were quickly re-sourced from Japanese and American suppliers, but the other two were only supplied by Philips. This time Philips cooperated at the highest level. Nokia's chairman and chief executive, Mr Ollila, met with the Philips CEO Mr Boostra and the head of the Philips semiconductor division, Mr van der Poel. Factories at Eindhoven and Shanghai were rescheduled to supply the missing chips, and engineers from both Nokia and Philips worked to accelerate the return of the Albuquerque plant to full production. As a result of these intensive efforts, there were relatively minor delays to Nokia's mobile phone shipments.

Executives at Ericsson in Sweden only learned of the problem several weeks after the fire. Company culture was less proactive than at its Finnish rival. The bad news was withheld from senior management long after it became clear that delays were becoming serious. By the time that Ericsson realised the magnitude of the problem, it was too late to find alternative sources. Nokia had seized remaining world capacity, and it took nine months for the situation to be rectified. The disruption led to a 3 per cent loss of market share by Ericsson, and contributed in turn to its exit from the phone handset market (it formed a joint venture with Sony in 2001).

(Sources: Sheffi, 2005; Latour, 2001)

Question

- 1 What are the key lessons from this case for dealing effectively with disruptions to the supply chain?

The implication of uncertainty for supply chain processes is that they need to be *flexible*. Flexibility is defined as the 'ability to react or transform [supply chain processes] with minimum penalties in time, cost and performance' (Upton, 1995). Flexibility comes in two basic forms (Sawhney, 2006):

- *Proactive*: to create the capability in advance to handle uncertainty – for example, Toyota's counter-measures.
- *Reactive*: to cope with uncertainty in a focal firm's internal or external environment – for example, Nokia's response to the fire at Philips.

Uncertainties, wherever they originate, may affect other supply chain partners. In Chapter 6, we develop the case for responding to uncertainty in supply chains under the theme of *agility*.

Acting responsibly: the sustainability advantage

The Brundtland report (UNWCED, 1987) defines sustainability as ‘development that meets the needs of the present without compromising the ability of future generations to meet their needs’. Logistics has increasingly been turned to in recent years because it offers enormous potential to mitigate damage to the environment in which we live. Many logistics decisions impact the environment – for example, sourcing from suppliers who use renewable raw materials and who practise ethical labour standards, and transportation modes that minimise carbon dioxide (CO₂) emissions. Sustainability emerges as a way of considering the environmental and social values of business decisions alongside their economic value. This thinking gave rise to the term ‘triple bottom line’ (TBL, Elkington, 1997, 2004). Taking these three ‘values’ in turn:

- *Environmental*: a focal firm such as Tesco is concerned with reducing consumption of non-renewable energy and materials. It is also concerned with measuring and reducing the environmental impact of processes across the SC – from cow to customer (Figure 1.1). And collection and disposal by the end-user is also factored in – what can be done to reduce the impact of car journeys and the disposal of waste such as packaging? TBL thinking states that environmental polluters should not be given a free ride any more – they should be made to pay. For example, the Australian government introduced carbon trading (Humphreys, 2007, compares tax v trading): under the carbon pollution reduction scheme, the government requires a 5 per cent reduction in CO₂ levels by 2020. Accreditation to the ISO 14001 series on environmental management systems is becoming increasingly influential. And the Environmental Protection Agency (EPA, 2010) seeks to ‘make sustainability the next level of environmental protection by drawing on advances in science and technology, applying government regulations and policies to protect public health and welfare, and promoting green business practices’.
- *Social*: large focal firms such as Nike and Wal-Mart have been forced to consider the social contexts of the suppliers with whom they deal. Often, suppliers are based on the other side of the world, but consumer pressure has forced such firms to recognise their responsibility in ensuring that goods are manufactured in socially responsible conditions – such as no child labour (see Case study 4.5). Organisations such as the Fairtrade Foundation (2010) aim to help farmers in developing countries:

By facilitating trading partnerships based on equity and transparency, Fairtrade contributes to sustainable development for marginalised producers, workers and their communities. Through demonstration of alternatives to conventional trade and other forms of advocacy, the Fairtrade movement empowers citizens to campaign for an international trade system based on justice and fairness.

Social issues have been developed more broadly under the theme *Corporate Social Responsibility* (CSR), which we examine in more detail in section 4.7.

- *Economic:* this is the net value that a firm generates after social and environmental values have been taken into account. This implies making the connection between TBL values and financial performance. The organisational changes involved in recognising economic value can be wrenching and can take years to implement. Nike – along with other premium brand companies – came under enormous pressure from labour activists in the 1990s to adopt more sustainable codes of conduct in their global supply chains. For example, purchasing teams had to be constrained from going for lowest prices from suppliers, which threatened short-term profitability. So Nike had to ‘offset any first-mover disadvantage by getting both its competitors and suppliers involved . . . it is essential to work with others to move toward the adoption of a common approach to labour compliance codes, monitoring and reporting to help ensure broader accountability across the industry as a whole’ (Zadek, 2004).

Supplier Codes of Conduct (such as Cisco Systems, 2009) are used to ‘give preference to suppliers who are socially and environmentally progressive’. In other words, sustainability has become a competitive advantage in its own right. Case study 1.5 outlines the operation of the Marks and Spencer ‘Plan A’.

CASE STUDY 1.5

Plan A at Marks and Spencer

In January 2007 Marks and Spencer (M&S) launched ‘Plan A’, its five-year strategy to improve the retailer’s social and environmental impact. Plan A currently sets out 100 commitments – goals to be achieved by 2012 – covering climate change, raw materials, waste, health and fair partnership. €300 million has been set aside to fund the plan over the five years, and 14 staff applied to its delivery. Noted in particular for its comprehensive approach and willingness to use the company’s influence with customers, suppliers, investors and politicians, the plan has been praised as an example of best practice as well as a means by which other agents may join M&S to change the way companies do business along more socially, environmentally and ethically beneficial lines. Plan A has so far won 27 independent awards.

In June 2009 M&S reported on Plan A’s progress to date and revealed that 39 commitments had been achieved, 24 of which have been extended. Another 50 are on or ahead of target. Ten are behind, and only one commitment has been put on hold; to make a 50 per cent switch to bio-diesel in its lorries, due to emerging concerns about deforestation. Thus M&S can claim that, at the two-fifths mark, it is on track to deliver its commitments, and furthermore stated that Plan A was cost positive by 2009.

It is not all plain sailing: carbon footprint reduction, as one example, has presented several challenges to M&S. Its reported 18 per cent net reduction in greenhouse gas emissions is largely based on the company’s switch to buying electricity under ‘green’ tariffs – reductions that have already been counted by energy suppliers. M&S now report gross emissions excluding this saving – which show a 2 per cent growth. A factor in the rise is a 10 per cent increase in store size, also, M&S international air travel has increased. Mike Barry, head of sustainable business at M&S, points out that the company has ‘decoupled’ emissions growth from commercial growth, and is firm on its commitment to reduce emissions; nevertheless this marker alone shows the conflict between business growth and a target of reduced environmental impact.

M&S maintains that Plan A is not just another CSR ploy. Jonathon Porritt, adviser to M&S, agrees and points to its integration through the whole company, its detailed measurement of non-financial data and its focus on outcomes. Porritt asserts that Plan A 'really works' for shareholders as well as other stakeholders.

So how has M&S made sure Plan A 'really works'? Feedback tells the company that customers discern and value the Plan A difference between M&S and other retailers, and this translates into increased foot traffic and a wider customer base. And there are savings: increased energy efficiency; reduced fuel use; cutting food waste by discounting short shelf-life products; recycling internally, including coat hangers; innovation in recycling/re-use and purchasing, e.g. using PET plastic for home product filling as well as clothes; reducing water consumption; and being a good employer, thus reducing staff turnover and maximising payback on investment in training and good working conditions. All this, plus a name for encouraging customers and suppliers to change their behaviour, being a fair partner with suppliers, raising money for charity and promoting healthy lifestyles, makes customers want to buy more from M&S. Richard Gillies, Director of Plan A and Sustainable Business at the company, sums it up with 'As well as savings costs, Plan A differentiates our business and brings more customers into our stores.'

(Source: Barry, M. and Calver, L. (2009), 'Backing the future', *Marketing* (00253650), pp. 16–17.

Question

- 1 How has M&S made the social and environmental impacts of Plan A acceptable to its shareholders?

1.3.3 Soft objectives

There are other ways in which logistics advantage may be gained, but these are not so readily measurable as those listed above. They are referred to as 'soft' objectives as distinct from the more easily measurable 'hard' objectives. Examples of soft objectives are:

- *confidence*: queries answered promptly, courteously and efficiently;
- *security*: customer's information and property treated in a confidential and secure manner.

Soft objectives need to be measured in different ways to hard objectives, such as customer attitude surveys.

Logistics is not the only way in which product competitiveness in the marketplace can be enhanced. The performance objectives listed above can be added to (and in some cases eclipsed by) other ways in which products may win orders, such as design and marketing features. No matter how good the logistics system might have been, lack of an early 'clam shell' design led to the reduction of Nokia's market share for mobile telephone handsets in Europe. Superior product or service design – often supported by brand image – may become the dominant ways of achieving advantage in the marketplace. Here, the logistics task is to support the superior design. BMW's supply chain is one of the most efficient there is, mainly because its products are sold (at least in Europe) as soon as they have been

made. Finished cars do not accumulate in disused airfields across Europe, like those of the mass producers. Finished product storage adds cost, with no value added from an end-customer perspective.

1.3.4 Order winners and qualifiers

The relative importance of the above logistics performance objectives is usually different for a given market segment. A helpful distinction is that between order winners and order qualifiers (Hill, 2000):

- *Order winners* are factors that directly and significantly help products to win orders in the marketplace. Customers regard such factors as key reasons for buying that product or service. If a firm raises its performance on those factors, it will increase its chances of getting more business. Thus a product that competes mainly on price would benefit in the marketplace if productivity improvements enabled further price reductions.
- *Order qualifiers* are factors that are regarded by the market as an ‘entry ticket’. Unless the product or service meets basic performance standards, it will not be taken seriously. An example is quality accreditation: a possible supplier to major utilities such as PowerGen in Britain and EDF in France would not be considered seriously without ISO 9000 certification. And delivery reliability is a must for newspapers – yesterday’s news is worthless. Note that, in both examples, order qualifiers are *order-losing sensitive*: loss of ISO 9000 accreditation would make it impossible to supply to major utilities, and late delivery of newspapers would miss the market.

Order winners and qualifiers are *specific to individual segments*, a point we develop in the next chapter. Table 1.1 provides an example of how two different products made by the same manufacturer and passing through the same distribution channel have different performance objectives. The first product group comprises standard shirts that are sold in a limited range of ‘classic’ colours and sizes. The second product group comprises fashion blouses that are designed specially for each season in many colours and a choice of styles with associated designer labels.

Analysis of the order winners and qualifiers shows that the two product ranges have very different performance criteria in the marketplace. Of the two, the range of fashion blouses presents more logistics challenges because demand for individual skus are much more difficult to forecast. It is not until the season is under way that a picture begins to emerge about which colours are selling most in which region of the market. The logistics challenge is therefore concerned with speed of response and flexibility to changing demand. The logistics challenges between the two ranges are quite distinctive.

Not only can order winners and qualifiers be different for different products and services. They can also *change over time*. Thus, in the early phase of a new product lifecycle, such as the launch of a new integrated circuit, the order winners are availability and design performance. Price would often be a qualifier: provided the price is not so exorbitant that no one can afford it, there is a market for innovators who want the best-performing chip that is available. But by the maturity phase of the lifecycle, competitors have emerged, the next generation is

Table 1.1 Different product ranges have different logistics performance objectives

	Classic shirts	Fashion blouses
<i>Product range</i>	Narrow: few colours, standard sizes	Wide: many colours, choice of styles, designer labels
<i>Design changes</i>	Occasional	Frequent (at least every season)
<i>Price</i>	Everyday low price	Premium prices
<i>Quality</i>	Consistency, conformance to (basic) spec	High grades of material, high standards of workmanship
<i>Sales volumes</i>	Consistent sales over time	Sales peak for given fashion season
<i>Order winners</i>	Price	Time-to-market Brand/label Quality
<i>Order qualifiers</i>	Quality Availability	Price Availability
<i>Logistics priorities</i>	Cost Dependability Quality	Speed Flexibility Quality

already on the stocks, and the order winners have changed to price and product reliability. The former order winners (availability and design performance) have changed to become order qualifiers. The logistics challenge is to understand the market dynamics and to adjust capabilities accordingly.

The *actions of competitors* are therefore a further influence on logistics performance objectives. For example, low-price competitors are a feature of most markets, and attempt to differentiate themselves from the perhaps higher-grade but pricier incumbents. Thus competitors such as Matalan have sparked fundamental changes in logistics strategy at M&S (see Case study 1.5). In response to loss of sales to cheaper new entrants, M&S ditched long-standing agreements with local UK suppliers and sourced garments from new, lower-priced suppliers in the Far East.

While the above helps to show some of the thinking in setting logistics strategy, there are limitations to the use of order winners and qualifiers. They are subjective, and so provide *perceived* relative priorities. While this creates useful debate between marketing and logistics, it lays the foundation for more informed strategy setting in the context of the values of other variables in Table 1.1 such as volumes. We develop this point in section 2.4. It is also important to share understanding of these priorities with partners, a point which we develop next.

1.4 Logistics strategy

Key issues: What is 'strategy'? How can competitive criteria be aligned within a supply chain? How can logistics strategies be tuned to different product needs?

1.4.1 Defining 'strategy'

Strategy is about planning as distinct from doing. It is about formulating a long-term plan for the supply chain, as distinct from solving the day-to-day issues and problems that inevitably occur. Extending the concept of 'strategy' from Hayes and Wheelwright (1984):

Logistics strategy is the set of guiding principles, driving forces and ingrained attitudes that help to coordinate goals, plans and policies, and which are reinforced through conscious and subconscious behaviour within and between partners across a network.

All too often, logistics 'strategy' is set using few such characteristics: decisions are made piecemeal by accident, muddle or inertia. We need, however, to recognise that strategic decisions may indeed be made by such means.

Whittington (2000) proposes four approaches to setting strategy. He starts by suggesting different motivations for setting strategy:

- *How deliberate are the processes of strategy setting?* These can range from clearly and carefully planned to a series of ad hoc decisions taken on a day-to-day basis.
- *What are the goals of strategy setting?* These can range from a focus on maximising profit to allowing other business priorities such as sales growth to be included.

If we make these two considerations the axes of a matrix, Figure 1.10 suggests four options for crafting strategy.

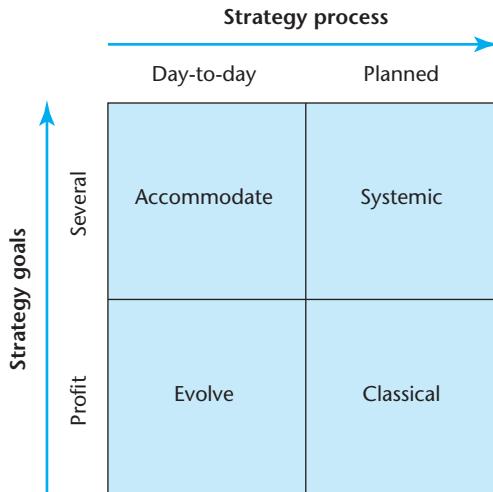


Figure 1.10 Four options for crafting strategy

What are the implications for the way in which supply chain strategy is approached in different organisations? Following is a brief description of the four options:

- *Evolve.* 'Strategy' is not something that is formally undertaken at all. 'Our strategy is not to have a strategy' is a typical viewpoint. Operating decisions are taken in relation to the needs of the moment, with financial goals as the main guiding principle.

- *Classical*. While financial goals are again the main guiding principle, these are achieved through a formal planning process. This is called 'classical' because it is the oldest and most influential option.
- *Accommodate*. Here, decisions are back to the day-to-day mode, but financial objectives are no longer the primary concern. Strategy is accommodated instead to the realities of the focal firm and the markets in which it operates.
- *Systemic*. This option for strategy setting sees no conflict between the ends and means of realising business goals. While goal setting takes place across all major aspects of the business (including human resources, marketing and manufacturing policies), these are linked to the means by which they will be achieved in practice.

Logistics strategy usually demands systemic strategy setting between network partners, who may have to coordinate order winners and qualifiers across different market segments.

1.4.2 Aligning strategies

In section 1.1 we showed the supply chain as a network of operating processes. In section 1.2 we emphasised the need to 'integrate' these processes to maximise flow and focus on the end-customer. And in section 1.3 we saw how supply chains can choose to compete on a range of different competitive priorities. Now it is time to put these ideas together and show how strategies need to be *aligned* across the supply chain.

If different links in the supply chain are directed towards different competitive priorities, then the chain will not be able to serve the end-customer as well as a supply chain in which the links are directed towards the same priorities. That is the basic argument for alignment in the supply chain (Cousins, 2005). Where the links are directed by a common and consistent set of competitive criteria, then that supply chain will compete better in the marketplace than one in which the links have different, conflicting priorities. This is the concept of 'focus'.

Focus is based on the view that you cannot be good at everything. For example, it is difficult to handle high volume, low cost products in the same channel to market as low volume, high variety products, for which flexibility is the name of the game. While the assembly line is the method of choice for manufacturing cars in volume, development of prototypes for new models is kept well away from the factory in special facilities until close to launch. This is because the development process demands quite different technical skills and equipment that are better physically separated from the more routine, efficient and repetitive assembly line. In the example of the standard shirts and fashion blouses in section 1.3, the associated operations processes would be kept separate ('focused') for similar reasons. And the separation could be thousands of kilometres. 'Classic' shirts could be sourced from China, where prices are low, and long delivery lead times are not so important. 'Fashion' shirts may be sourced nearer to home, because response time is key and cost is less important (see Case study 8.1).

What happens when the processes are not aligned within a supply chain? Let us address that question with Case study 1.6 to show the problems that can arise.

**CASE STUDY
1.6**
Talleres Auto

Talleres Auto (TA) is an SME based in Barcelona. TA attends to broken-down vehicles, providing a roadside repair and recovery service. Two of the parts that TA frequently uses are starters and alternators, which were obtained from a local distributor. In turn, the local distributor ordered parts from a prime distributor. Starters and alternators were obtained from a remanufacturer, who replaced the windings and tested the products using parts bought from a component supplier. A diagram of this part of the supply chain is shown in Figure 1.11.



- Talleres Auto is the installer
- TA buys starters and alternators from a local distributor
- The local distributor buys from a prime distributor
- The prime distributor buys from the remanufacturer
- The remanufacturer buys components from a component supplier

Figure 1.11 The Talleres Auto supply chain

Most of TA's customers made 'distress purchases' – their car had broken down and they wanted it to be fixed quickly. So TA needed a fast replacement service from the local distributor. While the distributors both recognised the need for fast replacements, the performance of the purchasing department at the remanufacturer was measured on cost savings. Thus the component supplier thought that the name of the game was low cost.

(Source: Harland, 1997)

Questions

- 1 What were the order winners and order qualifiers at TA?
- 2 What were the order winners and order qualifiers at the component supplier?
- 3 What impact on customer service was this lack of alignment likely to cause?

1.4.3 Differentiating strategies

A supply chain, then, may choose to compete on different criteria. Such criteria need in turn to be recognised and form part of the business strategies of all the members of a given network. The choices so made have major implications for the operation of each member. Failure to recognise competitive criteria and their implications for a given product or service *by any member* means that the supply chain will compete less effectively. It is like playing football when the goalkeeper makes an error and lets in a goal that should not have happened – he or she lets the whole side down.

What makes a successful strategy? Five principles of strategic positioning, related to logistics strategy, are as follows (after Porter, 1984):

- *A unique value proposition:* determining what makes the product/service different from its competitors.
- *A tailored supply chain:* governed by consistent order winning and qualifying criteria.
- *Identify the trade-offs:* by choosing not just the priorities but also what not to do. A responsive supply chain is not compatible with an efficient supply chain (Fisher, 1997).
- *Align logistics processes:* so that processes are mutually reinforcing.
- *Continuity:* logistics processes are continually and consistently improved over time.

1.4.4 Trade-offs in logistics

To reinforce the issue of differentiating strategies, let us look at two commonly used strategies that have very different logistics implications. Consider products with different logistics priorities, such as those in Table 1.1:

- *Cost:* a high volume product for which demand is relatively stable throughout the year. While subject to occasional enhancements, these are usually small scale: the lifecycle is comparatively long. Forecast error is relatively low.
- *Time:* a high variety product, which is designed for a given season and which is completely redesigned for the next season. Often, it is impossible to predict which colour or style will sell best. The product lifecycle is short, and forecast error is relatively high.

Cost and time have quite different logistics implications. The very actions that help to reduce costs, such as Far East sourcing, are completely the wrong strategy when speed and responsiveness are top of the agenda. Similarly, investing in high volume, low variety equipment in the factory may create efficiency and low cost, but limit a firm's ability to offer variety and fast response times. Developing the capability to support more of one priority (cost) hobbles the capability to support another (time). This is the principle of *trade-off* in logistics: more of one thing means less of another. Ideally, we want two separate supply chains, one focused on cost, the other on time. This may not be fully practical because of the need to maintain a single European distribution centre. But logistics operations within the DC may well be kept separate to avoid product lines where the priority is low cost from interfering with time sensitive product lines. The same thinking may also apply *within* a given product range, when everyday ('base') demand may need to be kept separate from promotional ('surge') demand. These are two examples of the various ways in which trade-offs may apply in practice. We return to these concepts in the next chapter.

Activity 1.3

- 1 Using the concepts from this section, analyse the supply chain support for both of the products you analysed in Activity 1.2. What should the supply chain be (*functional-efficient or innovative-responsive*)? What is the reality, and why are the two different?
- 2 To what extent is there alignment of strategy in the supply chains for these two products?

Summary

How does logistics work within the supply chain?

- Supply chain management is defined as 'SCM encompasses the planning and controlling of all processes involved in procurement, conversion, transportation and distribution across a supply chain. SCM includes coordination and collaboration between partners, which can be suppliers, intermediaries, third party service providers and customers. In essence, SCM integrates supply and demand management within and between companies in order to serve the needs of the end-customer.'
- Logistics is defined as 'the task of coordinating material flow and information flow across the supply chain to meet end-customer needs'.
- In a supply chain, materials flow from upstream to downstream. Demand information from the end-customer flows in the opposite direction. A focal firm is positioned within a supply 'network', with tier 1 suppliers and tier 1 customers its immediate neighbours. Material flow measures the quantity of material that passes through a given network per unit of time.
- A supply network is a system in which each organisation is linked to its immediate neighbours. Therefore the overall performance of the network results from the combined performance of the individual partners.
- Logistics supports competitiveness of the supply chain as a whole by meeting end-customer demand through supplying what is needed when it is needed at low cost.

What are the performance objectives of the supply chain, and how does logistics support those objectives?

- 'Hard objectives' are quality, speed and cost because they are easy to measure and relatively obvious to the end-customer. Briefly, quality is about doing things right, speed is about doing things fast, and cost is about doing things cheaply. Supporting capabilities are concerned with controlling variability (the dependability advantage), dealing with uncertainty (the rapid response advantage) and acting responsibly (the sustainability advantage). Uncertainty can be addressed by flexibility in logistics processes – either proactively or reactively. Sustainability is concerned with addressing the 'triple bottom line' – social, environmental and economic values. 'Soft objectives' are service-oriented, such as security and confidence. They are less easily measurable than hard objectives.
- Such performance objectives can, and often are, augmented by other objectives that are outside logistics. These include product superiority, innovation and brand. Here the logistics task is to support such performance objectives in the marketplace.
- The relative importance of logistics performance objectives varies from one situation to another. It can also vary over time. The concept of order winners and qualifiers helps to prioritise the logistics task. Key influences on relative importance are individual product needs in the marketplace, position in the product lifecycle and competitor activity.

- Logistics strategy is the set of guiding principles, driving forces and ingrained attitudes that help to communicate goals, plans and policies, and which are reinforced through conscious and subconscious behaviour within and between partners across a network.

Discussion questions

- Bill Gates of Microsoft describes the 2000s as 'business @ the speed of thought'. Discuss the importance of speed in the supply chain. How can speed be increased within the supply chain?
- Suggest logistics performance priorities for the following, explaining why you have come to your conclusions:
 - a low fare airline such as Ryanair;
 - a fast food chain such as McDonald's;
 - an overnight parcels service such as DHL.
- What is meant by the term *alignment* in relation to supply chain processes? Why is alignment important in setting a strategy for a given supply chain?
- What does *flow* mean in a supply chain context? Explain how material flow relates to information flow in a supply network.

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CHAPTER 2

Putting the end-customer first

Objectives

The intended objectives of this chapter are to:

- develop the marketing perspective on logistics and the need for close coordination between the two functions;
- explain how customer segmentation works, and to emphasise its importance to logistics;
- outline the role of demand forecasting and the links with marketing;
- explain the connection between quality of service and customer loyalty;
- show how current segmentation practice can be re-engineered to set logistics priorities.

By the end of this chapter you should be able to understand:

- how supply chains should compete by aligning logistics strategy with marketing strategy;
- how to use logistics strategy drivers to help redefine segments to achieve this alignment.

Introduction

In Chapter 1 we looked at the logistics task from the perspective of material flow and information flow. We also saw how logistics contributes to competitive strategy and the performance objectives by which we can measure this contribution. But what is it that drives the need for flow in the first place? The key point to recognise here is that it is the behaviour of the end-customer that should dictate what happens. The end-customer starts the logistics response by buying finished products. It is this behaviour that causes materials to flow through the supply chain. Only end-customers should be free to make up their minds about when they want to place an order on the network – after that, the system takes over.

Quality of service addresses the process of handing over products and services to end-customers. It is after this process has been completed that a product/service reaches its full value. And the handover process offers many opportunities for adding value. Instead of picking up a product from a distributor who is remote from the focal firm, there are opportunities during the sales transaction (for example, help and advice in using the focal firm's products), as well after the sales transaction (for example, after sales service and warranty).

This chapter explores the link between marketing strategy and logistics strategy. It introduces this link, and shows how it is possible to identify logistics priorities – and hence the tasks at which logistics needs to excel.

Key issues

This chapter addresses four key issues:

- 1 The marketing perspective:** the impact of rising customer expectations and the information revolution.
- 2 Segmentation and demand forecasting:** and their implications for logistics strategy.
- 3 Quality of service:** the link between customer satisfaction and customer loyalty.
- 4 Setting priorities for logistics strategy:** creating advantage by redefining segments in logistics terms.

2.1 The marketing perspective

Key issue: What are the marketing implications for logistics strategy?

'Marketing' has traditionally been associated with anticipating, identifying and satisfying customer requirements profitably. In our terms, such a definition emphasises the focal firm and outbound logistics. But a more current definition emphasises value in the context of the broader supply chain – and that includes partners rather than just customers:

Marketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, partners, and society at large.

(American Marketing Association, 2007)

Marketing in practice comprises the plans and decisions that determine how these processes will be carried out.

Ultimately, satisfied end-customers are seen as the only source of profit, growth and security. Sir Terry Leahy, Chief executive of Tesco plc, talks of harnessing customer power (2005):

The basic assumption that customers choose – that they know best what they want – means that they have become the centre of the retailer's universe. In the best businesses, their decisions drive everything. These choices are also judgements. They pick the winners and losers in retail and in manufacturing. This is not theoretical: they regularly pass verdicts, moving from product to product and store to store. These judgements send strong feedback – shocks might be a better word – forcing change.

Louis Gerstner (2002: 47) explained that the amazing turnaround of IBM in the 1990s was about 'a customer was now running IBM'.

In Chapter 1, we referred to 'tier 1 customers' with whom a focal firm deals directly, and to 'end-customers' who are the individuals or businesses that buy the finished 'product' at the downstream end of the supply network. It is therefore usual to refer to two types of customer:

- *business customers*: who represent the focal firm's immediate trading environment (see Figure 1.2);
- *end-customers*: who represent the ultimate customer for the network as a whole (see Figure 1.4).

We refer to these types of relationships as 'business to business' (B2B) and 'business to customer' (B2C) accordingly. In section 1.2.2 of Chapter 1, we referred to the need to integrate supply chain processes so that they are aligned towards end-customer needs. In this sense, B2B integration should be aligned towards the ultimate B2C process.

We also need to distinguish here between customers and consumers. Webster (2000) defines them thus:

- *consumers* are people who use or consume the product;
- *customers* are individuals or businesses who buy the product, meaning that they acquire it and pay for it.

It is usual in business today to refer to 'customers' as the next process downstream in a supply chain. This includes 'all types of marketing intermediaries or channel members who buy for resale to their customers' (Webster, 2000).

But 'satisfied customers' are increasingly hard to find. This has been caused by widespread changes that are affecting the world we live in. Two of the major changes are rising customer expectations and the information revolution (Doyle, 2000). We expand on these below.

2.1.1 Rising customer expectations

Expectations have risen among customers in line with a general increase in the wealth of developed countries over the last half century. This increase in expectations has many causes, including:

- better levels of general education;
- better ability to discern between alternative products;
- exposure to more lifestyle issues in the media.

These expectations have led to customers not only aspiring to more desirable products, they are also demanding much better levels of service to be associated with those products.

Businesses are also expecting more from their suppliers. Suppliers need to pay increasing attention to the service aspects of their dealings with industrial customers. This is especially true when the customer has implemented more customer-centric management systems such as just-in-time (Chapter 6).

2.1.2 The information revolution

The explosion in applications of internet technology continues to have sweeping effects on the way that business is transacted today. Applications that have sprung from the world wide web have impacted both B2C and business to business B2B relationships.

- *Business to consumer (B2C)*: online retailing has developed rapidly in recent years, and organisations such as Amazon.com continue to extend the range of products they offer. Many retail firms based on the traditional 'bricks and mortar' model have fought back by launching their own websites and online catalogues. The world wide web has become another channel to market for the

retail industry, as home shopping accelerates in industry sectors as diverse as books, music and furniture.

- *Business to business (B2B)*: here, the impact has been even greater than in B2C, but perhaps less visible. Businesses increasingly use web portals, online marketplaces and other collaborative online applications to exchange information, undertake transactions (such as buying and selling) and organise delivery and payment. These forms of inter-firm collaboration are leading to closer integration of processes between businesses and helping to break down some of the traditional barriers in buyer-supplier relationships.
- *Supply chain implications*: developments in B2B and B2C exchanges also have an impact on how the supply chain operates. The ability to exchange information more effectively and accurately should enable more reliability in supply chain operations, as well as lowering the costs of ordering. The availability of shared information also facilitates improved management of inventory, forecasts and use of assets. Web-enabled data exchange facilitates replacement of inventory with information, resulting in lower working capital.

Faced with rising customer expectations and the information revolution, supply chain partners are increasingly looking at how they can be more demand-led, and respond more rapidly to market requirements. The starting point is to put the end-customer first by analysing their needs and wants. The marketing perspective has a well-known way to help in this analysis – segmentation.

2.2 Segmentation

Key issue: What is segmentation, and what are its implications to logistics strategy?

Segmentation describes how a given market might be broken up into different groups of customers with similar needs. It means ‘describing the market as simply as possible while doing our best to emphasise its variety’ (Millier and Palmer, 2000). We start by considering market segmentation from a *customer* perspective in what are usually described as ‘fast-moving consumer goods (FMCG)’ markets. For example, segmentation of the market for suntan creams and lotions would begin with an understanding of:

- the benefits wanted (e.g. water resistance, oil/non-oil, sun factor);
- the price consumers are prepared to pay;
- the media to which they are exposed (television programmes, magazines, Google ads, etc.);
- the amount and timing of their purchases.

Profiles of the segments and evaluation of their relative attractiveness to a focal firm can then be developed.

There are many possible ways in which markets can be segmented, including:

- *demographic*: such as age, sex and education;
- *geographic*: such as urban v country, type of house and region;

- *technical*: the use that customers are going to make of a product;
- *behavioural*: such as spending pattern and frequency of purchase.

Of the various ways to segment markets, we have found that behavioural segmentation, which ‘divides buyers into groups based on their knowledge of, attitude towards, and use of or response to a product’ (Kotler and Keller, 2009) is a powerful way to bridge marketing and logistics. For example, Finne and Sivonen (2009) describe a study of behavioural segments in convenience stores in Europe. Six segments were identified – main, top-up, impulse, distress, grab-and-go and habitual shoppers. ‘Top-up’ shoppers may only value bread, milk and convenience foods, while an ‘impulse’ shopper is attracted by special offers and displays.

It is vital that the definition of segments is not a marketing-only task, but that logistics is involved. The key point is that defining segments that cannot be served because logistics capability does not exist is unlikely to work. For example, if most of the spending pattern is around Christmas, then logistics must be capable of supporting the huge surge in demand at that time. Case study 2.1 explains how a retailer views its behavioural segments.

CASE STUDY 2.1

Managing events and promotions in the retail sector

If end-customers only purchased their requirements in line with their use, then it would be relatively easy to reorganise the end-to-end supply chain from shelf to national warehouse using lean principles (see Chapter 6). A simple demand–pull system replenishing tomorrow that which has been sold today, direct to shelf, would streamline store operations and reduce inventories significantly. Retailers such as Wal-Mart in the US and Tesco in Britain have pursued an everyday low price policy in an attempt to maximise this ‘steady state’ replenishment policy. However, in Europe, most retailers have found that customers enjoy promotions and that promotions boost sales. In any case, events such as Christmas and back to school create huge surges in demand.

Events may be divided in two: seasonal events and promotional events, as shown in Table 2.1.

Table 2.1 Example seasonal events and promotions

Seasonal events	Promotions
<ul style="list-style-type: none"> ● Valentine’s Day ● Mother’s Day ● Summer holidays ● Back to school ● Christmas 	<ul style="list-style-type: none"> ● Three for two ● Buy one get one free ● 10% off for a week ● Happy hour – 20% ● Triple loyalty card points ● Gift with purchase

Retailers have no control over the timing of seasonal events and it is usually very difficult to forecast likely demand with normal levels of accuracy. In contrast, promotional events are planned by retailers and their suppliers. Consequently, while demand may be unpredictable, the timing of such events is known in advance. It is surprising, therefore, how often consumers will find that items on promotion are not on the shelf and that display aids and promotional material will be missing. The event that has the greatest effect is

Christmas – where sales usually start growing in October, ramp up in November and peak in December. This is the *only* profitable quarter for many retailers. The product is frequently sourced from the Far East and once the order has been delivered there will be no further shipments. Retailers need to plan for this activity months in advance and cross their fingers that they will not miss sales through under-ordering or buy too much with the consequent write-downs in the January sale. The position is further complicated in a national chain where demand patterns will be different store by store and region by region.

Many retailers allocate their Christmas merchandise to individual stores on the basis of previous year's sales for the particular product category and hope for the best. A lean design supply chain is unable to cope with such spiky demand, which will be affected further by marketing efforts and the latest fad. Retailers therefore need to be particularly agile in their approach in order to satisfy unknown demand.

Boots the Chemist (BTC) – the leading UK health and beauty retailer – has approached this problem by outsourcing specific Christmas merchandise deliveries. These deliveries are scheduled at different times of the day from 'normal' deliveries. In this way, while not dealing with the issues created by unpredictable demand, store operations can apply appropriate resources to unload vehicles and put away directly to shelf or indirectly to stockroom. Historically, promotional events in BTC were a fairly hit and miss affair with hundreds of products being promoted within a four-week window. There was a high reliance on good luck for all the elements to come together prior to the start of the promotional period. Inevitably some products, display aids and show material arrived late. Store operations at the end of the supply chain then had to try and mount the promotions with what had been delivered. Consumers were dissatisfied with the result and sales were lost.

The solution was to create a dedicated promotions team within the categories. The team masterminded the overall promotional plan and were made responsible for the delivery of products, display aids and show materials into the national distribution centres (NDCs). A successful trial was then conducted whereby most of the work required to mount the promotion was done by logistics staff in the regional distribution centres (RDCs) for each of the individual stores.

The trial comprised sending allocations of all the promotional requirements to the RDCs from the NDCs. Staff in the RDCs then picked products for a week's anticipated sales (based on historical data for that line by individual store) into totes for direct-to-shelf delivery together with appropriate display aids and show material. The totes were then placed on dollies, rolled on and off vehicles, and wheeled into the shop to the correct gondola end (end of free-standing 'island' shelf in a store). After three days, EPOS data were reviewed, and an accurate prediction of future sales to the end of the promotion was made. This was then used to calculate future replenishment requirements. Finally the merchandising teams were invited to devise clever ways to make shelves look full at the end of the promotion without using a lot of stock. This resulted in fewer 'remainders' from a promotion that had to be written down. BTC is currently implementing its design for a transformed end-to-end supply chain and the work described above is being gradually rolled out.

(Source: Philip Matthews, formerly Supply Chain Director, BTC)

Question

- 1 List the logistics challenges of mounting promotions and coping with events at a retailer such as BTC.

Activity 2.1

Figure 2.1 shows a Pareto analysis of the annual sales to 886 customers in the portfolio of a book stockist. What actions could the stockist take to segment its market? How could each segment best be served? What are the operational implications for the stockist? (Check out Chris Anderson, 'The Long Tail' at <http://www.thelongtail.com/about.html>).

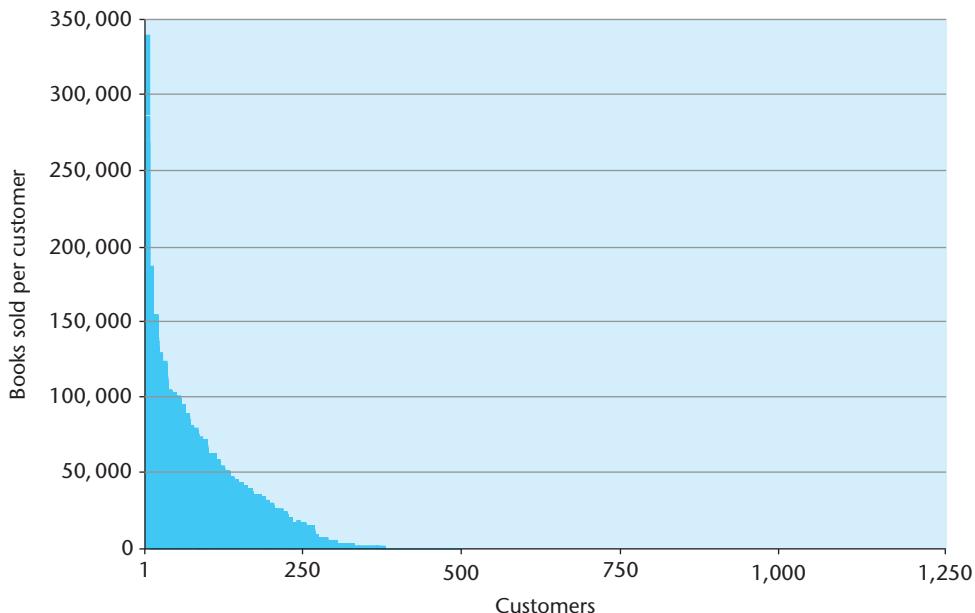


Figure 2.1 Annual sales per customer for a book distributor, shown as a Pareto diagram

The important characteristics of segments (McGoldrick, 2002) are that they must be:

- *measurable*: variables that can be easily identified and measured;
- *economically viable*: capable of producing the contribution that justifies the effort and cost of marketing;
- *accessible*: geographically or in terms of media communications;
- *actionable*: can be attracted and served effectively.

The next step is to select target segments and identify how a focal firm is going to win orders in each. In other words, to define *differential advantage* that distinguishes our offerings from those of our competitors. In logistics terms, the important issues here are the order winning criteria (OWC), and qualifying criteria (QC) for the target segments. These help in turn to define the *marketing mix*.

The marketing mix is the set of marketing decisions that is made to implement positioning strategy (target market segments and differential advantage) and to achieve the associated marketing and financial goals. The marketing mix has

been popularly termed the '4 Ps' (McCarthy, 1964):

- *product*: range, sizes, presentation and packaging, design and performance;
- *price*: list price, discounts, geographical pricing, payment terms;
- *promotion*: sales force, advertising, consumer promotion, trade promotion, direct marketing;
- *place*: channel selection, market coverage, distribution systems, dealer support.

Logistics contributes fundamentally to the 'place' decisions, as well as supporting 'product' and 'promotion' decisions. All too often, 'place' activities are viewed as the bit bolted to the back of production that gets inventory away from the factory and into stock-holding points such as warehouses. In order to achieve the goal of 'the right product in the right place at the right time', logistics systems and processes need to be designed to support products in the marketplace.

Segmentation principles can also be applied to industrial marketing. But 'there are distinct differences between the marketing of industrial products and consumer goods' (Millier and Palmer, 2000: 60), as summarised in Table 2.2.

Table 2.2 Comparison between consumer and industrial marketing

	Consumer	Industrial
Customers	Many, widely dispersed	Few, concentrated
Market	Consumers directly served by retailers and distributors	Derived demand Industrial chain, long and complex
Buying behaviour	Individual and family decision	Group decision Formal procedures High buyer power
Relationships	Low individual buying power	Formal procedures High buyer power
Product	Standard Positioned on emotional and perceptual factors	Technical complexity Specification important Bespoke and customised
Price	Low unit price Take it or leave it No negotiation	High unit price Tender and negotiation Standard items from price list
Promotion	Mass media advertising Role of the brand	Emphasis on personal selling Reputation important
Place	Established retail chain Stock availability, Seasonality	Direct made to order Standard items in stock

Let us turn to an industrial marketing example to illustrate how new segments can impact on logistics capability.

CASE STUDY 2.2

Powerdrive Motors

Tom Cross took over as Managing Director at Powerdrive Motors in South Africa three years ago. At the time, the company was an established manufacturer of small electric motors with a strong reputation for product reliability and technical leadership. On the

downside, it was also regarded in the trade as having high prices and variable delivery. Tom's first task was to tackle the huge product variety on offer. He saw this as the major problem in addressing the negative views in the marketplace, and also saw opportunities in streamlining design and production. The product range was replaced with a new generation of designs based on a few hundred 'modules', which could be assembled in many different combinations to give variety at low cost. This meant the loss of some customers who had gone to Powerdrive because they could rely on the company's technical leadership to produce designs that suited their particular needs. This was not considered important because the combined sales volume of such customers was under 5 per cent.

Using the new designs, Tom was now able to reorganise the factory into cells that produced major subassemblies such as rotors and stators. The work flow was transformed, and manufacturing throughput time was reduced from six weeks to just four days. Cost improvements meant that average price reductions of between 10 and 15 per cent could be offered.

Powerdrive's customer service policy was redrafted to offer quotations within a maximum of one hour of any enquiry, and for deliveries of finished product to be made within one week 'anywhere in northern Europe'. This new policy was explained to internal sales staff, and to sales representatives and agents employed by the organisation. If 'old' customers wanted special designs that were no longer in the range, the sales staff were instructed to explain Powerdrive's new policy and politely decline the order.

At first, business soared. Impressed by the lower prices and short delivery times, customers flocked to Powerdrive and sales jumped by 50 per cent. But then things began to go sour. First, the factory could no longer cope with the demands being placed on it. The addition of a large order for lawnmower motors blocked out a lot of production capacity from January to June. Order lead times during this period in particular slid back to former levels. Second, a Brazilian supplier spotted the opportunity to enter the market with prices that undercut Powerdrive by 20 per cent. While only half of the product range was covered by this new entrant, it was the high volume products that were especially threatened. Further, the new competitor offered three-day lead times from stock that had been established in the country. Third, some of the former customers who could no longer obtain their bespoke designs from Powerdrive were complaining within the industry that Powerdrive's technical leadership had been sacrificed. Although small in number, such customers were influential at trade fairs and conferences.

Questions

- 1 Evaluate the changes that took place in the segmentation of Powerdrive's market.
- 2 Characterise the changes using the concept of order winners and qualifiers.

Segmentation is often undertaken by adopting the easy way to group customers – by account size. While this is easily measurable, it fails on the fourth of McGoldrick's criteria listed above: it is not actionable in logistics terms. An example from our research in the fast-moving consumer goods (FMCG) sector illustrates the problems of poor alignment between marketing and logistics.

**CASE STUDY
2.3**

Segmentation at CleanCo

CleanCo is a Polish manufacturer of cleaning products that serves the European grocery retailing market. CleanCo currently segments its customers on the value of customer accounts. The primary division is between *national accounts*, for which ten accounts constitute 70 per cent of sales by value, and *field sales*, which comprise a long 'tail' of more than 200 accounts that together make up only 30 per cent of sales. Due to the size of the field sales structure, a secondary classification groups accounts by channel type: neighbourhood retail, discount and pharmacy. CleanCo recognises the need to reduce the long customer 'tail' and is introducing distributors for orders below a minimum quantity. CleanCo's current approach to segmentation is summarised in Table 2.3.

Table 2.3 CleanCo – current approach to market segmentation

National accounts	Field sales		
70% sales	30% sales, 200+ accounts		
10 accounts	Neighbourhood retail	Discount sector	Pharmacy

While CleanCo currently segments its retail customers by account size, its sales organisation has identified two significant types of buying behaviour displayed by the customer base, shown in Table 2.4:

- *volume-driven* buying behaviour;
- *margin-driven* buying behaviour.

Volume-driven customers are keen to capitalise on both product and supply chain cost savings in order to pass them on to their customers to drive volume sales. There are two variants of the volume-driven behaviour:

- everyday low price (EDLP);
- discount.

Retailers pursuing an EDLP strategy strive for continuous price reduction from suppliers such as CleanCo to drive a fairly consistent, high volume of sales. This should result in a relatively stable pattern of demand in the washing and bathing sector. Discounters, on the other hand, are looking for bargains so they can 'stack 'em high and sell 'em cheap', a strategy more likely to result in a volatile demand pattern. Margin-driven customers are keen to add value for their customers by offering a wide selection of products and value-adding services. This strategy also results in a relatively stable demand pattern in this sector.

Table 2.4 CleanCo – potential for behavioural segmentation

Volume-driven	Margin-driven
Everyday lowprice (EDLP)	
Discount	

A complicating factor when trying to deconstruct the buying behaviour of CleanCo's customers is that several secondary factors are used to support products in the marketplace.

Such factors include product types (e.g. premium, mid, utilitarian), product range (e.g. current products, end of lines, 'b' grade), merchandising requirements (e.g. category captains) and promotions strategy (e.g. roll-back, 12-week, 4-week, Hi-Lo). Promotions are by far the most disruptive of these factors. Although the promotions are generally planned well in advance with the retailers, they cause significant disruption to the supply chain operations due to the peaks and troughs in demand that they create. Furthermore, the deeper the promotional activity the greater the volatility created and the greater the disruption to the supply chain. This has the effect of masking what is fundamentally a fairly stable demand pattern with somewhat artificial volatile demand.

Strategic alignment can only be achieved if the supply chain is aligned behind the segmentation strategy that CleanCo has adopted. This is not currently the case with the CleanCo supply chain. Each operation within the supply chain makes decisions or segments its customers based on the functional criteria that affect its part of the supply chain. We have called this lack of alignment 'matrix twist', because the matrix of business processes at each stage of the supply chain has been apparently twisted so that the processes fail to fit with each other. As illustrated in Table 2.5, the decision criteria for CleanCo and its suppliers and customers change at each stage. This not only complicates material flows, but becomes a minefield if one considers it in terms of behavioural segments.

Table 2.5 Supply chain segmentation criteria

Management process	Supply chain decision	Determined by
Source	Which suppliers?	Raw material commodity type
Make	Which manufacturing site?	Product family type
Deliver	Which manufacturer order size?	Historically a function of warehouse? In process of being divided by export paperwork requirements and customer account (arbitrary split)
	Which customer RDC?	Product type and location of store to serve
	Which products to which store?	Demographics of the store's catchment area, which drives layout and range decisions

(Source: Godsell and Harrison, 2002)

We develop the management processes 'source', 'make' and 'deliver' in the next chapter.

Questions

- 1 What has caused the 'matrix twist' between CleanCo and its retail customers?
- 2 What actions are needed to straighten out the 'matrix twist'?

2.3 Demand profiling

Marketing people want to forecast demand in order to plan broad goals such as allocating the salesforce, setting sales goals, promotions planning and advertising campaigns. But logistics people need to know how many to deliver, where and when to do so, for each sku in the product range and for each channel – not just for the range as a whole. This leads to a common perception of the two functions – marketing dealing in the abstract and logistics dealing in the day-to-day realities. The two business functions must be careful not to talk past each other, for both have important insights into what the end-customer wants. For many firms, of course, this is not an issue, and the two functions collaborate extensively. The aim is to combine forces and produce the most accurate profile of future demand.

It is impossible to predict the future with certainty, so it is necessary to *forecast* what will happen. Accurate forecasts of demand are one of the key starting points for achieving competitive supply chains, reflected in such measures as high on-shelf availability (the percentage of a trading day for which a given sku is available ‘on the shelf’ to be purchased by an end-customer) and low inventories. The key approaches to forecasting demand are explained at length in such texts as Wild (2002) and Waters (2003). Here, we will stick to some of the broad principles that apply to forecasting: first when there are limited or no historical data available, and second when such data are available.

First, consider the demand profiles in Figure 2.2 when forecasting demand for a new product during the early stages of its lifecycle (introduction and growth).

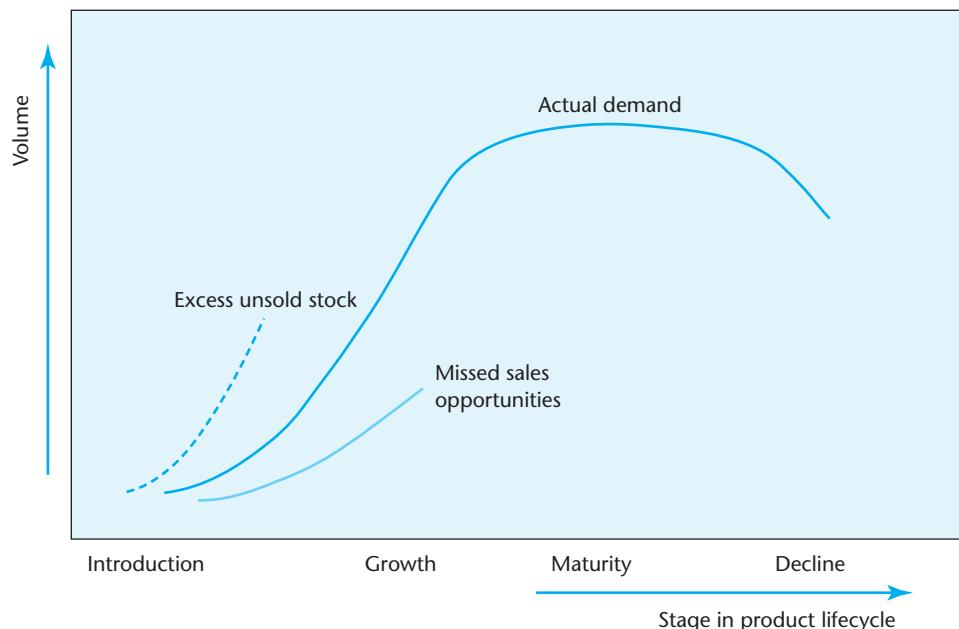


Figure 2.2 The impact of uncertainty

A forecast which over-estimates the way that demand takes off results in too much inventory too early in the product lifecycle. If this situation is allowed to continue, it will result in the need to get rid of the surplus unsold stock by markdowns or by disposal. On the other hand, a forecast which under-estimates actual demand results in insufficient stock to meet what the end-customer wants. If allowed to continue, this results in lost sales opportunities and hence loss of market share to competitors who can better meet demand. Both scenarios are familiar challenges for grocery (such as managing promotions) and planning fashion goods for a new season when there is no directly usable history of demand, and forecasting relies on *judgemental* methods such as historical analogy, perhaps augmented by market research. New drugs (called ‘new pharmaceutical entities’, NCEs) are especially problematic because of the uncertainties of approval from the Food and Drug Administration (FDA) – which takes five years on average – and the take-up by physicians after launch. Lifecycle curves and growth functions can be used to model demand by incorporating ‘market based evidence, uncertainty and judgements about what might happen during the drug’s lifetime’ (Latta, 2007).

When historical demand data such as point of sale (POS) are available, various modeling techniques can be used to produce *projective forecasts*. Consider the demand profile in Figure 2.3, which shows actual demand for years 1–3, and forecast demand for years 1–4. It is based on the profile of sales of a product called ‘barbecue sauce’, which is produced in many flavours and is sold mainly in the summer.

Differences between actual A and forecast demand F (Case study 1.3 uses scheduled demand, S) for each period n of years 1–3 are termed the *error*, E:

$$E_n = A_n - F_n$$

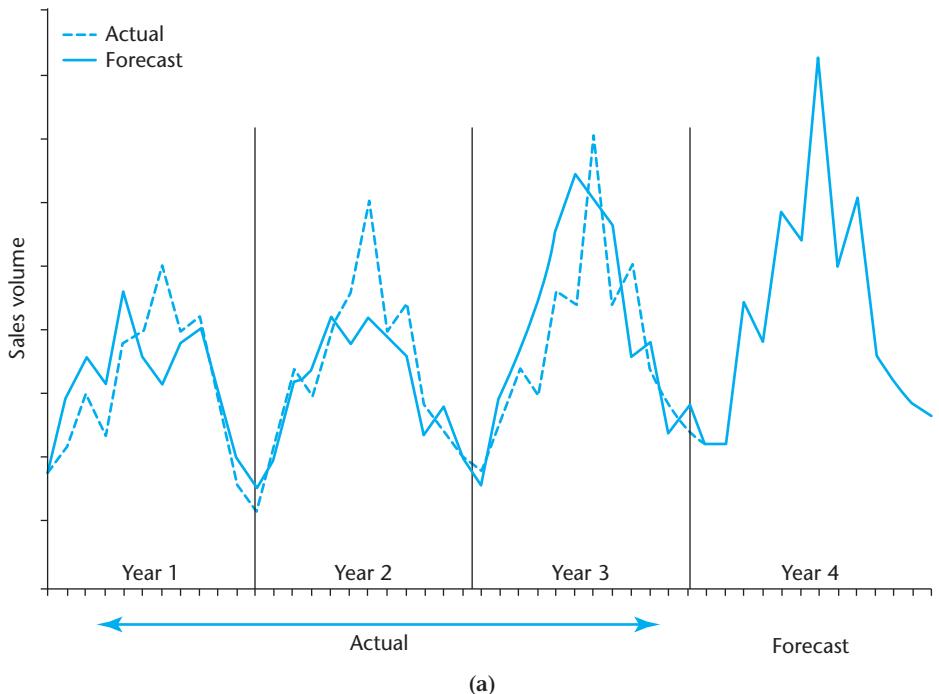
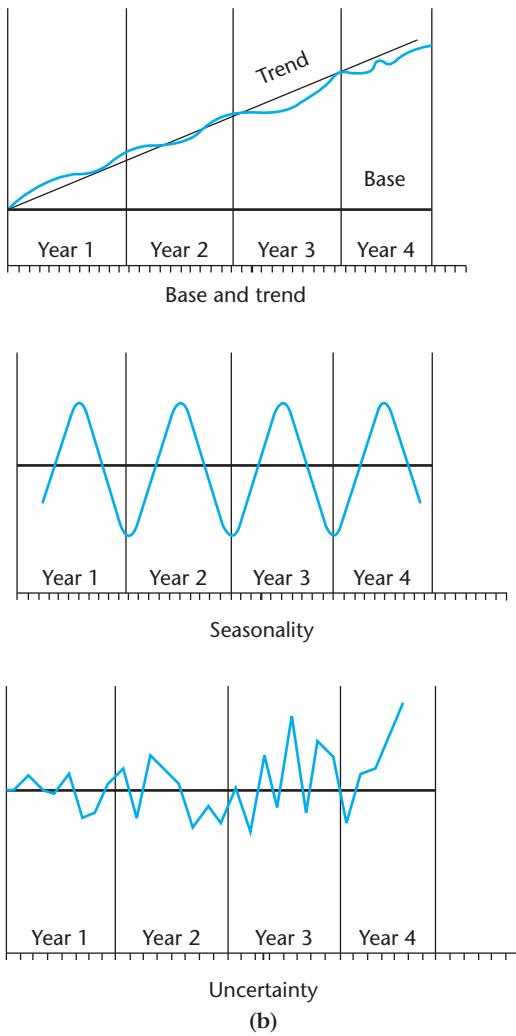


Figure 2.3 Modelling trend and seasonality (continued)

**Figure 2.3** Continued

If data are collected over a number of periods n (here, $n = 36$), then the *mean absolute deviation* (MAD) is a widely used measure of forecast error:

$$\text{MAD} = 1/n^* \sum_{n=1}^N |A_n - F_n|$$

In practice, the MAD may be exponentially weighted to give higher weightings to the most recent demand data (Wild, 2002: 176).

The sidebar on Figure 2.3 shows how the total (aggregate) demand for this product can be broken down into four components:

- *Base*: the level demand that needs to be adjusted for trend and seasonality.
- *Trend*: the long-term trend, which shows a healthy increase year-on-year from base.
- *Seasonality*: the periodic increase and reduction in demand as a result of consumer behaviour – in this case between summer and winter. This can be measured by

means of a *seasonal index* – which is the seasonal value divided by the trend, calculated for each period.

- *Uncertainty*: sometimes called ‘randomness’, this is the balance of demand due to effects we cannot explain. These effects may include short-term weather variations, which mean that the consumer is put off barbecuing because it is too cold, wet or windy. Other demand ‘spikes’ may be due to special causes like the promotion of a particular flavour of sauce by a chef in a popular television programme.

Base and trend demands can be found by linear regression analysis, and a seasonality index can be found by dividing the original data by the trend for each period. Uncertainty is usually allowed for by *increasing* the forecast to provide a safety margin to make it unlikely that there are missed sales opportunities (see Figure 2.2). Forecast demand for a future period n is then calculated from;

$$F_n = (\text{base} + \text{trend}_n) \times \text{seasonality index}_n + \text{uncertainty}_n$$

So forecast demand for year 4 was based on projecting historical data for these four components into the future.

So far, the forecast has been carried out at the aggregate level, ‘barbecue sauce’. And this is what forecasting professionals often encourage you to do – forecast accuracy is best at aggregate level and worst at sku level. But there are many flavours in the range – such as sweet hickory, Cajun and peri-peri. And there are different pack sizes and territories that are supplied. So the aggregate plan has to be *disaggregated* into individual skus. This is often achieved by calculating the percentage of the total demand for each sku from historical data, and then applying a seasonality index to refine the forecast for each period (see, for example, Ogrodowczyk, 2008). We return to the issue of disaggregation in section 6.1.1.

Forecasting is a major factor in logistics today, and we have only touched on some of the key issues in this section. We address further issues in other sections of this book as follows:

- Because of uncertainty, it is better to rely less on forecasting by shrinking lead times and engaging more closely with actual demand (section 5.1.3).
- Several management approaches can be used to improve forecast accuracy (section 7.1.3).
- Forecasting should be recognised as a key business process (section 7.2.4).
- Poor internal coordination compounds forecasting problems (section 6.1.3).
- External coordination with partners in a supply chain can be used to develop better forecasts through collaborative planning, forecasting and replenishment (CPFR, section 8.3).

Activity 2.2

Explain how marketing and logistics functions should work together to develop segmentation plans that can more easily be made to work in practice, and to create more accurate forecasts of demand.

2.4 Quality of service

Key issues: How do customer expectations affect logistics service? How does satisfaction stack up with customer loyalty?

Most supply chains that involve physical products end with *service* processes such as retailing (grocery or apparel), healthcare (pharmaceutical and other medical goods) and distribution (motor cars). Service processes mean that the customer is present in some way, although distribution through web-based shopping, telephone and mail order mean that customers do not have to be physically present. Performance of service processes often differs between employees, between customers and from one hour to the next. If you want good service from the local supermarket, do not go on Saturdays or near to Christmas when the service is under severe capacity pressure: on-shelf availability is at its lowest, and queues at the checkout are at their longest. The key point is that ‘service is the combination of outcomes and experiences delivered to and received by the customer’ (Johnston and Clark, 2008).

Quality of service takes place during service delivery, which is the interaction between the customer (B2B or B2C) and the service process. ‘Gaps’ can emerge between what the service is supposed to be, what the customer expects it to be, and how the customer perceives it when it is delivered (Zeithaml *et al.*, 1988; Parasuraman *et al.*, 1991). We can illustrate these gaps as a simplified gap model (Figure 2.4):

- *Gap 1* refers to differences between customer expectations and how these have been developed into a service specification by the supplier.
- *Gap 2* refers to differences between how the specification was drawn up and how it was delivered.
- *Gap 3* refers to differences between what the customer expected and what he or she perceived was delivered.
- *Gap 4* refers to differences between how supplier and customer perceived the service delivery.

Gaps in quality of service can arise, as seen in Case study 2.4 on IKEA.

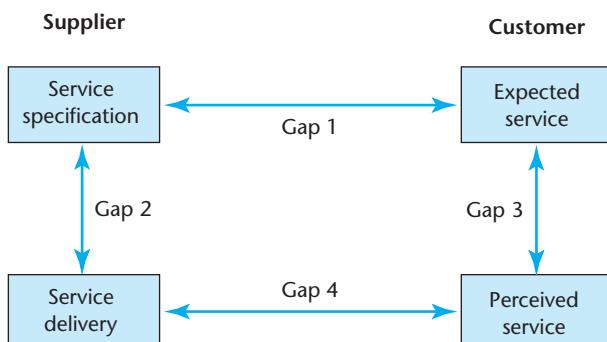


Figure 2.4 Simplified service quality gap model

(Source: After Parasuraman *et al.*, 1991)

**CASE STUDY
2.4****Tears at teatime at IKEA**

Next week, Jane Fillimore will move into a new flat. You can tell something about the 28-year-old music-industry publicist from Kilburn, north-west London, from the list of furniture she is buying. There is the Pax Brivic wardrobe, the Norden dining table and the Bonde media storage combination. Fillimore wants style – but on a budget. She is part of Generation IKEA.

Not that she wants to be. She hates the Swedish retailer, and only last Sunday had her worst shopping day ever at the firm's superstore in a drab retail park near the new Wembley stadium in London.

She wanted to pick up the Pax Brivic wardrobe she had ordered the week before. Easy, you might think, but just getting served was an ordeal. When she entered the store, an assistant told her to 'walk the mile of hell' past wannabe-stylish urban living rooms to the giant storage zone.

The store did not have her wardrobe and a salesman sent her back through road works to IKEA's nearby distribution centre. The distribution centre had the wardrobe, but could not give it to her without a receipt. To get one, she had to go back to the main store. But the main store had lost her order, so she had to go to customer service. This department is not called customer service at IKEA, it's called customer returns, and it took her half an hour to find.

By 4.30 pm, Fillimore was right back where she started. Exasperated, she put her head in her hands and burst into tears. 'I don't even like the wardrobe', she sobbed. 'I bought it because it's cheap. That's the only reason I come here.' By 5.00 pm, the store is closing, and she can only dream of getting her wardrobe by Friday. She could walk back through the little sets that represent the nation's living rooms to try one last time to find her wardrobe, but she can't face it. As she walks out, I ask her if she knows that Argos and Sainsbury's (two other UK retailers) are selling furniture. For the first time all day, she breaks into a smile.

'Really?' she grins. 'I'll go there tomorrow. I never want to come back to this place again.'

(Source: Based on an article by John Arlidge, *Sunday Times*, 26 October 2003)

Question

- When IKEA was founded 60 years ago by Ingmar Kamprad, he realised that customers did not mind queuing, collecting their purchases and assembling the furniture themselves as long as the price was right. Suggest why gaps in quality of service have opened up.

2.4.1 Customer loyalty

While plugging gaps in service quality helps to improve customer satisfaction, this is a 'qualifier' for long-term customer loyalty. The two concepts are not the same. Piercy (2009) distinguishes them as follows:

- *Customer satisfaction* is what people think of us – quality of service, value for money. It is an *attitude* (how does a customer feel about our product/service?).
- *Customer loyalty* is how long we keep a customer (or what share of his or her business we take). It is a *behaviour* (does he or she buy from us more than once?).

Nevertheless, the attitude of customer satisfaction is key to the behaviour of customer loyalty. Parasuraman and Grewal (2000) link the two concepts by proposing the 'key drivers of customer loyalty', shown in Figure 2.5. Also, note the connection to Tesco's core purpose on page 6. There is a purpose to this beyond the words: Tesco seeks actively to extend its relationships with customers by offering a broad range of services such as optician, pharmacy, non-food, and bank and insurance products. All purchases in these diverse categories and its core grocery business are rewarded by the firm's *loyalty programme*, which provides Tesco with further detailed insights into the behaviour of its customers. This data can be used for sophisticated segmentation that allows all customers to be 'scored' in one or more segments to allow accurate measurement and targeting (Finne and Sivonen, 2009).

The benefits of customer loyalty are potentially huge. The loyal customer should be viewed in terms of lifetime spending potential. Thus, a customer of VW Audi Group could be viewed as worth €300k rather than the €30k of today's sales transaction. As Johnston and Clark (2005) put it, loyal customers:

- generate long-term revenue streams (high lifetime values);
- tend to buy more than new customers;
- tend to increase spending over time;
- may be willing to pay premium prices;
- provide cost savings compared with attracting new customers.

The logistics challenge is to support the development of customer loyalty by designing and delivering quality of service. Of the three drivers of customer loyalty shown in Figure 2.5, quality of service is 'essential for excellent market performance on an enduring basis' (Berry, 1999: 8–9). The rationale for this is that 'service quality is much more difficult for competitors to copy than are product quality and price'. Supporting product availability through such means as channel selection, market coverage, distribution systems and dealer support all help to nourish customer loyalty. So does logistics support of product characteristics (such as variety or product range) and of marketing initiatives (such as promotions).

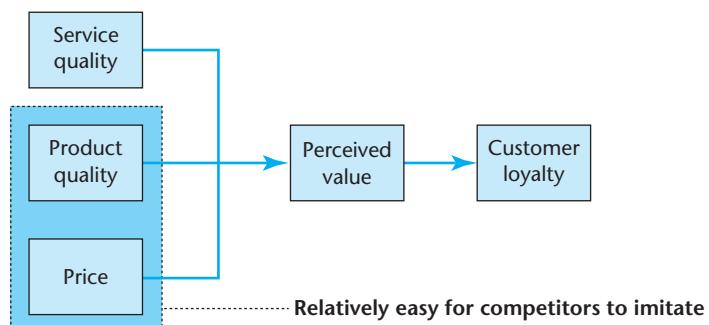


Figure 2.5 Key drivers of customer loyalty

(Source: After Parasuraman and Grewal, 2000)

2.4.2 Value disciplines

Figure 2.5 refers to ‘perceived value’. A development of the service quality–product quality–price model is that of *value disciplines*. Instead of competing on all of these fronts equally, Treacy and Wiersema (1997) argue that companies taking leadership positions do so by narrowing their competitive focus, not by broadening it. They propose three strategies, or ‘generic value disciplines’ that can be followed:

- *Operational excellence.* Here, the strategy centres on superb operations and execution, often by providing a reasonable quality at low price. The focus is on efficiency, streamlining operations, supply chain management and everyday low price. Most large international corporations use this discipline.
- *Product leadership.* Here, the leaders are very strong in innovation and brand marketing and operate in dynamic markets. The focus is on development, innovation, design, time-to-market and high margins in a short timeframe. ‘It was the ability of Apple to innovate in many spaces – getting the music companies to agree to 99 cent pricing, creating wonderful iTunes software, making a terrific physical product, the iPod, that just works in your hand – that gave Steve Jobs his success. It was building an ecosystem of innovation, not just the iPod, that did it’ (<http://www.businessweek.com/innovate/NussbaumOnDesign/>).
- *Customer intimacy.* Here, leaders excel in customer attention and customer service. They tailor their products and services towards individual or almost individual customers. The focus is on customer relationship management (next section): they deliver products and services on time and above customer expectations. They also look to lifetime value concepts, reliability and being close to the customer.

While most organisations are under pressure to reduce prices, speed up delivery and improve customer service, the best will have a clear focus (page 29) as a key part of their competitive strategy. This focus needs to be improved and adapted over time.

Activity 2.3

Evaluate Treacy and Wiersema’s value disciplines based on Porter’s views on differentiating strategies (section 1.4.3).

2.4.3 Relationship marketing and customer relationship management (CRM)

A development of customer intimacy is relationship marketing. Here, the aim is to develop long-term, loyal customers through ‘bonding’ with them. This development can take place at three levels (de Chernatony and McDonald, 2003):

- *Financial incentives:* such as frequent flyer schemes and reward cards.
- *Social and financial bonds:* from a dentist making personal notes about clients that can be used on subsequent visits to accountants taking their clients to rugby matches.
- *Structural bonds:* such as IT systems that bind client and customer together, sometimes called ‘electronic handcuffs’.

This development process becomes a strategic task. The principle behind customer relationship management (CRM) is that marketing strategies are continuously extended in order to strengthen customer loyalty. Eventually, customer and supplier are so closely intertwined that it would be difficult to sever the relationship. In other words, the exit barriers become higher and higher. CRM 'provides enhanced opportunities to use data and information to both understand customers and co-create value with them. This requires a cross-functional integration of processes, people, logistics and marketing capabilities that is enabled through information, technology and applications' (Payne and Frow, 2005). Figure 2.6 compares CRM thinking with traditional relationships that are limited to buying and selling functions of the organisations concerned (Payne *et al.*, 1995). We explore the issue of partnerships in the supply chain further in Chapter 9. Case study 2.5, Batman, illustrates the evolution of diamond-type relationships in an industrial setting.

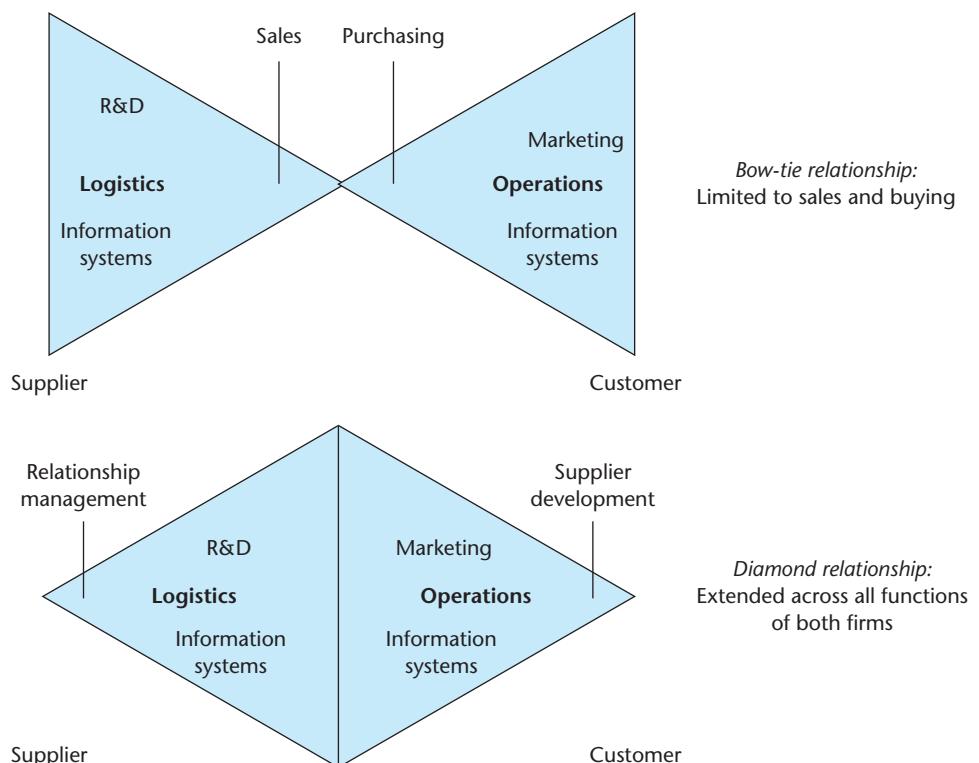


Figure 2.6 Customer relationship management: bow tie and diamond

(Source: After Payne *et al.*, 1995)

CASE STUDY 2.5

Batman – adding value through quality of service

Everglo Battery, the premier battery manufacturer and service provider in South Africa, looked back on the development of its marketing strategy in four stages. Each had been signalled by advancing the concepts of what is meant by 'quality of service'. Stage 1 had been the basic product: a sealed lead-acid battery for use in mining applications. Batteries were regarded by customers as a mature product and as a 'grudge buy'.

Each year, the basic product was under heavy downward price pressure. Stage 2 had been the industry reaction to customer service: the addition of warranty replacement of defective products, of quality assurance (QA) audits of a supplier's design and manufacturing processes, and of parts and service provision.

Stage 3 had recognised the need to go much further in terms of customer service. A whole raft of additional services had been conceived with a view to adding value. Breakdowns were fixed at short notice by means of field service engineers. Everglo products could now be delivered and installed at customer premises. Price lists were simplified by including peripheral equipment, such as contactors, that had to be added to a battery rack in order to make it work. Advice and tips were added to help customers warm to Everglo products. In a proactive move, Everglo introduced charts and advice about the application of battery products in general, and the resulting tables became an industry standard. Parts and service in the field were upgraded to a '24-hour, no-nonsense back-up service'. And customer training built on Everglo's position as an industry leader. Rather than sales seminars, Everglo's were customer training seminars, where the company spoke on behalf of the industry rather than as a supplier.

In spite of having reached a pre-eminent position in mining power supply, Everglo recognised that the centre of Figure 2.7 was in effect a 'black hole'. Each year,

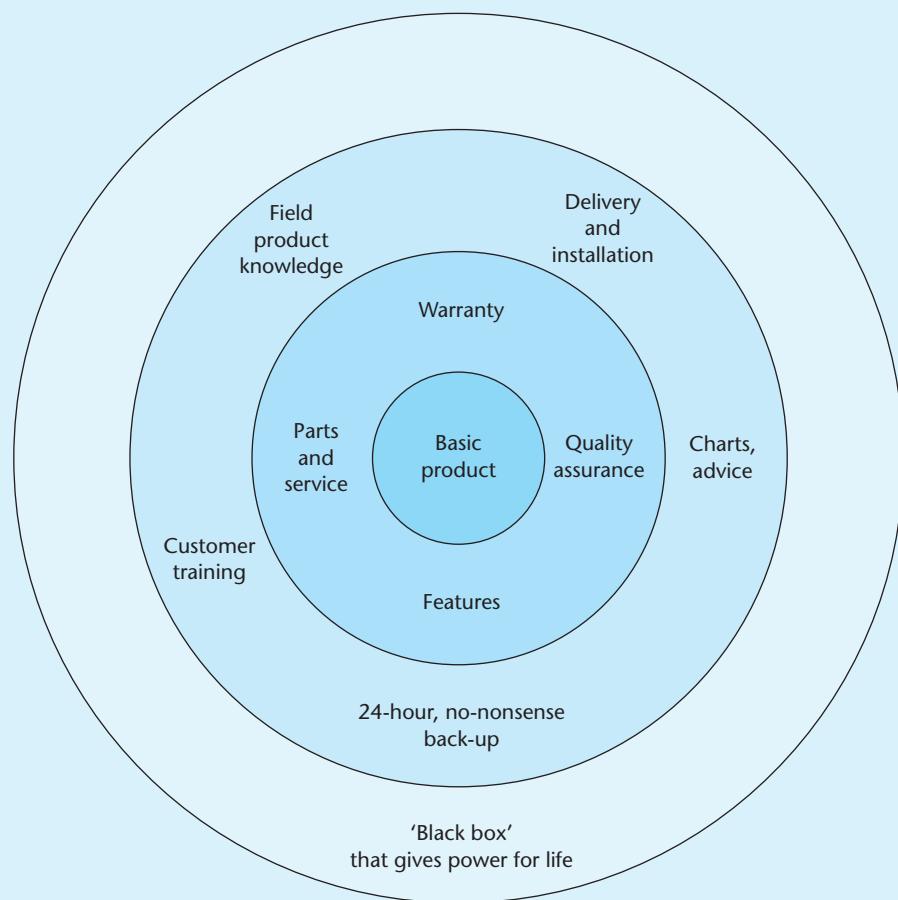


Figure 2.7 Adding value by quality of service

competitors added more services to their basic products too. In effect, the second and to some extent the third circles were being absorbed into the 'commodity' category, and customer expectations increased all the time. A new stage 4 strategy was conceived to take Everglo into a position that competitors would find even more difficult to follow. The new strategy was coined 'Batman': battery management for life. The aim was nothing less than a total, customer-oriented product management service that provides 'power for life'. The supplier takes over the task of managing the customer's assets, including problem identification, training and managing cash flow. The objective of 'Batman' is to look at the product the way the customer does, performing best at what the customer values most rather than at what the supplier values most.

Questions

- 1 Has Everglo reached the end of the line in terms of its quality of service strategy?
- 2 As a competitor to Everglo, what would be your options in response to Everglo's latest moves?

2.4.4 Measuring service quality

Going back to the start of this section, it is helpful to have in place measures of performance of service processes. These can be used to monitor performance over time and to compare ('benchmark') the processes with others. Table 2.6 lists examples of service level measures used in retail supply chains.

2.5 Setting priorities for logistics strategy

Key issues: How can we segment our market to make it easier to supply? How can we use such knowledge to improve logistics strategy?

Setting priorities to assure quality of service leads to establishment of performance measures. Priorities should be used to help ensure that:

- partners in a supply network focus on providing end-customer value;
- partners in that network can see how well the network as a whole is performing against this yardstick.

In this way they can judge whether performance is improving or declining, and assess the effect that changes to the system may have on quality of service.

In order to set priorities for quality of service, we begin by putting the end-customer first. The aim is to identify groups of end-customers whose needs can be serviced in focused, targeted ways. The needs define groups and give them an identity, as we explained in section 2.2 on segmentation. Because segments therefore have different characteristics, it is usually a mistake to take a 'one size fits all'

Table 2.6 Selected service level measurements in retail supply chains

Inventory/availability	<p><i>Physical and accounting correspondence:</i> number of orders with mistakes divided by the total number of orders in the warehouse in the same period of time</p> <p><i>Stock turnover:</i> quantity delivered or shipped divided by the average stock in the warehouse in the same period of time</p> <p><i>Stockout:</i> number of orders out of stock divided by the total number of orders placed in the same period of time.</p>
Flexibility	<p><i>Flexibility:</i> number of special/urgent/unexpected orders confirmed to the customer divided by the total number of special/urgent/unexpected orders required by the customer multiplied by 100 in the same period of time</p>
Service care	<p><i>Punctuality:</i> number of orders delivered on time divided by the total number of orders delivered multiplied by 100 in the same period of time</p> <p><i>Regularity:</i> number of orders delivered with a nt of delay/advance divided by the total number of orders delivered multiplied by 100 in the same period of time</p> <p><i>Completeness:</i> number of full orders delivered divided by the total number of orders delivered multiplied by 100 in the same period of time</p> <p><i>Correctness:</i> number of orders with mistakes dispatched divided by the total number of orders dispatched multiplied by 100 in the same period of time, or</p> <p>Number of codes/articles sent back divided by the total number of codes/articles sent multiplied by 100 in the same period of time</p> <p><i>Harmfulness:</i> number of damaged orders dispatched in a period divided by the total number of orders dispatched in the same period multiplied by 100</p> <p><i>Delay:</i> number of days of delay (or number of days of delay divided by the number of days promised) multiplied by 100</p>
Supply conditions	<p><i>Delivery frequency:</i> number of orders delivered in a certain period of time</p> <p><i>Shipped quantity:</i> quantity shipped in a certain period of time or quantity dispatched for each shipment</p> <p><i>Presentation:</i> method of packaging and of shipment, alignment with customer process</p>
Lead time	<p><i>Total order cycle time:</i> occurring from the arrival of a customer order to the receipt of goods or cycle time of the single activities (order transmission, order processing, order composition, order transfer to the production plant, article production, warehouse delivery, final delivery to the customer)</p> <p><i>Response time:</i> to order tracking requests, etc.</p>
Marketing	Range completeness, information on products and selling assistance
Order management	Documents management (invoices and orders), client contacts and order advancement state, etc.
After sales	<i>Speed of response:</i> to back orders, claims management, use assistance and payment management, fulfilment of warranty conditions, etc.
e-information	Web site completeness, ease of making orders by network and data transmission security, etc.

(Source: After Rafele, 2004)

approach to servicing them. Our research has shown that the starting point for segmentation is often conceived by marketing in isolation, and does not make any sense in logistics terms (Godsell *et al.*, 2006). Logistics is therefore left with an impossible task. Since logistics is actually part of the marketing mix (see ‘place’ under section 2.2 above), ability to provide quality of service is off to a bad start!

Our framework for creating logistics advantage (Harrison, 2010), shown in Figure 2.8, therefore starts by reviewing and re-engineering the current approach to market segmentation in a focal firm and its immediate supply chain partners. Typically, this re-engineering takes place in collaboration with strategic suppliers two tiers upstream and strategic customers two tiers downstream.

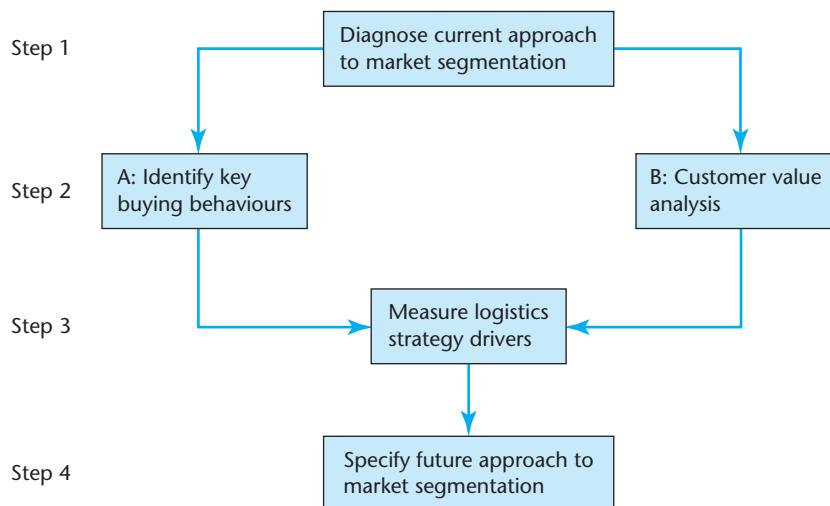


Figure 2.8 Creating logistics advantage: a four-step process

Source: (Harrison, 2010)

2.5.1 Step 1: Diagnose current approach to market segmentation

Current approaches to segmentation may drive elements of logistics strategy to a limited extent, or they may have no relevance in logistics terms. Segmentation in the CleanCo case (Case study 2.3) was based on national accounts and field sales, that is, by account size. This was in line with the way that sales and marketing functions were organised. There were no effective links between marketing and logistics – in logistics terms, only the distribution function was differentiated according to channel.

Another example from our research is AutoCo, a manufacturer of automotive seat subassemblies which supplies seat manufacturers such as The Lear Corporation, and automotive assemblers such as BMW. AutoCo currently segments its customers first by the country from which customers purchase, and second by customer within that country. Customer facing teams (CFTs) comprise a sales manager, an engineer and a product designer. These teams deal with each of the segments, and place orders on manufacturing units (based in England, Poland, Norway and Sweden). While this made sense in marketing terms, CFTs were not

coordinated between customer countries. The supply network was therefore fragmented, and manufacturing units were left to compete with each other for business.

2.5.2 Step 2a: Understand buying behaviour

The sales organisation in the CleanCo case (Case study 2.3) had identified two significant types of buying behaviour by its retail customers: volume driven and value driven.

- *volume-driven behaviour* is driven by the retailers who want to offer low prices to end-customers in order to drive high volumes. The EDLP variant of this behaviour places pressure on supply partners such as CleanCo for continuous price reduction. In turn, this generates a relatively stable demand pattern for the supply chain – unlike a retailer who regularly promotes the same product by means of special offers.
- *margin-driven behaviour* is driven by offering a wide selection of products and value adding services. Cost savings were not necessarily passed on to the customer but could be used to invest in additional value adding activities. This strategy also resulted in a relatively stable demand pattern.

Other behaviours by retailers are also possible – such as discounting and promotion. But the key point is that the different behaviours must be characterised and specified in terms of their logistics implications, along the lines of Table 1.1. Using order winners and qualifiers helps to bridge marketing and logistics perspectives. While there are dangers in a ‘one size fits all’ logistics strategy (low cost but low service) in the same way that there are dangers in over-customisation (high cost and complexity), the compromise solution is to specify three or four substantive segments (Gattorna, 2006).

Discussing the characteristics of customer behaviour within a cross-functional group in a workshop setting helps to spawn ideas on patterns. It is often easier to make sense of the data if they are used to plot graphs and charts. Venn diagrams such as the one shown in Figure 2.9 are helpful to illustrate patterns that may appear among the analysed data.

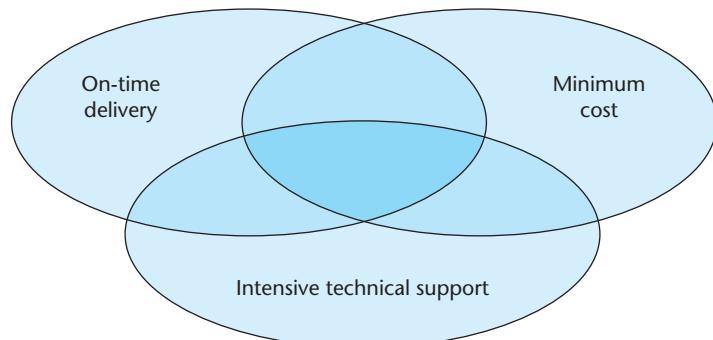


Figure 2.9 Analysing the influence of demand characteristics

2.5.3 Step 2b: Customer value analysis

Customer value is the customer-perceived benefit gained from a product/service compared with the cost of purchase. In order to measure customer value, we need to understand what *aspects* of a product or service a customer values (Johnson and Scholes, 2008). Here, we are primarily interested in aspects of customer value which impact on logistics strategy. Three aspects in particular relate to buying behaviours:

- *demand profile*: the characteristics of demand in terms of volume and variety, and of demand variability and uncertainty (section 2.3);
- *competitive profile*: how the focal firm chooses to compete in the marketplace (section 1.3);
- *product profile*: the extent to which the product is customised to specific customer requirements.

Customer value is assessed by means of a questionnaire to measure customer views of these aspects in terms of:

- *importance* (on a 0–100 scale);
- *performance* of the focal firm and a key competitor (0–5 Lickert scale);
- *price level* of the focal firm relative to the key competitor (0–5 Lickert scale).

Examples of customer value profiles for two customers of AutoCo (referred to in step 1 above) are shown in Figure 2.10

We return to the concept of ‘value’ in Chapter 3. Meanwhile, we will continue to use the AutoCo example to illustrate steps 3 and 4.

2.5.4 Step 3: Measure logistics strategy drivers

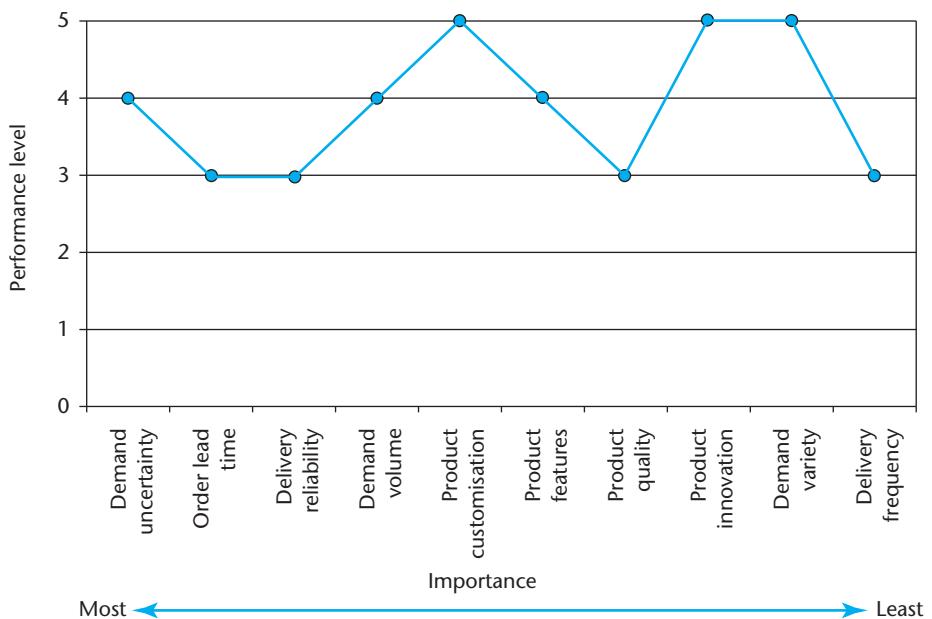
Here, we examine demand profile and competitive profile as drivers of logistics strategy (based on Godsell *et al.*, 2006):

- *Demand profile*. The time that the customer is prepared to wait to have his or her order fulfilled is defined as ‘D time’, which is further explored in section 5.2. D time may be measured in time-related measures from months to seconds. Essentially, this sets time objectives for the supply chain. Response in seconds means that there is no time to procure materials or to process them. Therefore, inventories of finished product are inevitable. However, as D times reduce in turbulent markets, holding inventories becomes an increasingly risky option, and in turn places increasing pressure onto supply capabilities. A focal firm may decide to respond to such pressure by reducing the range on offer, and by increasing the commonality of parts between different skus. At the other end of the scale, if the customer is prepared to wait for a long enough period to enable design and procurement processes to be completed, a relatively high level of customisation may be possible.

Forecast error (section 2.3) ties in with the logistics need to align mid- to longer-term capacity decisions with demand. In Chapter 5, we argue that reducing the total supply chain throughput time (P time) reduces the need to rely on forecasts. But clearly there is a limit to how far this ideal can be pushed. Being able to respond immediately to actual demand means that logistics

AutoCo customer A:

high volumes, short lead times
Coping with demand uncertainty and short order lead times are most important

**AutoCo customer B:**

uncertain demand, lower volumes
Product quality and delivery reliability are most important

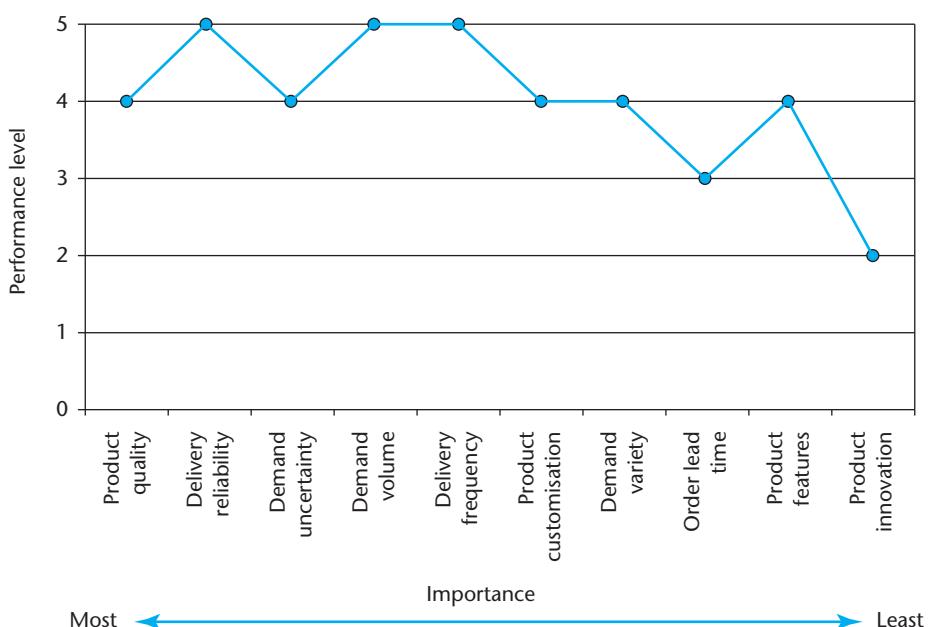


Figure 2.10 Customer segmentation using order winners

capabilities have been put in place to do so. In particular, it is still necessary to make mid- to longer-term forecasts – for example to allow for advanced orders to suppliers, long cycle time production processes and to expand facilities.

It is also tough in logistics terms to support high levels of *volume variation* of demand across a given time period in a given supply chain. Constraints such as capacity limitations and fixed order quantities and lead times inhibit what may be done. Building *buffer capacity* into the supply chain (in the form of inventories or spare production capacity) may be too costly. Instead, it helps to analyse the causes of volume variation. Two main factors are the differences between peaks and troughs of demand, and the frequency with which peaks and troughs occur. A standard seasonal pattern may have just one peak (summer for garden furniture, for example), whereas fashion industries may have six seasons or more. Retail promotions may create peaks every other week, which lead to volume variations of 60 to 70 per cent of ‘normal’ demand. Figure 2.11 shows how demand characteristics can be analysed.

- *Competitive profile.* This is based on the competitive factors we introduced in section 1.3 – hard objectives (quality, time and cost), supporting capabilities (controlling variability, dealing with uncertainty in logistics processes and sustainability) and soft objectives (such as confidence and security). For example, Ford chooses to compete on low price and delivery speed (by making to stock), while BMW chooses to compete by making more expensive and highly specified cars to customer order while the customer waits. While they also appear in the demand profile as characteristics, we refer here to variability and uncertainty in terms of a focal firm’s capability to cope with them better than competition.



Figure 2.11 Customer value profiles for two AutoCo customers

Source: (Harrison, 2010)

- *Product profile.* Determining the level of customisation requires analysis at two levels. First, the proportion of products and sourced components that are customised is measured for each sku supplied to the final process in the supply chain (e.g. retailer or distributor). This analysis can result in the categorisation of skus on the basis of levels of customisation: high, medium and low. Second, we need to understand which processes or components are customised and where they are positioned in the supply chain. For high levels of customisation, particularly where it occurs early in the supply chain, the complexity that is caused may be reduced in two ways. The relevance to customers may be questioned – is this extra variety giving value to the end-customer? Or, different options could be built in as standard. While some redundancy is created, greater standardisation of supply chain processes and shorter lead times are gained.

All three of these profiles have profound implications for logistics strategy, some of the key implications for which are summarised in Figure 2.12.

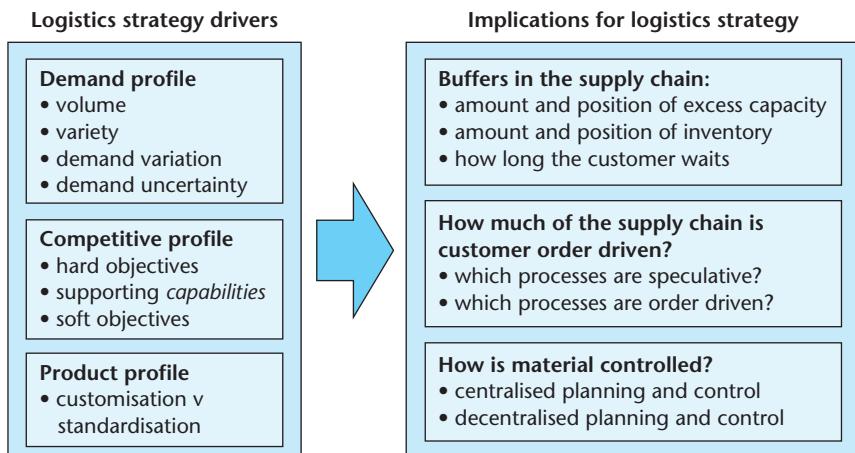


Figure 2.12 Strategy drivers and their implications for logistics strategy

For example, the higher the demand variability and uncertainty, the greater the need for buffers. Buffers can be in the form of spare capacity, inventory and order lead times. If we want to shorten the time the customer has to wait, then it is necessary to make speculatively – perhaps finishing off (customising) the product once the final order details are known. Finally, planning and controlling the flow of materials across the supply chain needs to be carried out centrally, when in high demand variability and uncertainty conditions in order to coordinate the response of supply partners. In more stable demand conditions, it is possible to relax controls and allow more local flexibility.

2.5.5 Step 4: Specify future approach to market segmentation

Using logistics strategy drivers it is now possible to revisit the customer value profiles in Figure 2.11 and develop a fresh approach to segmentation that makes sense in logistics terms. In Figure 2.13, the two customers (A and B) in Figure 2.11 are analysed in terms of their key demand and competitive profiles. Customers A and B both want 100 per cent on time – in full – on quality delivery. However,

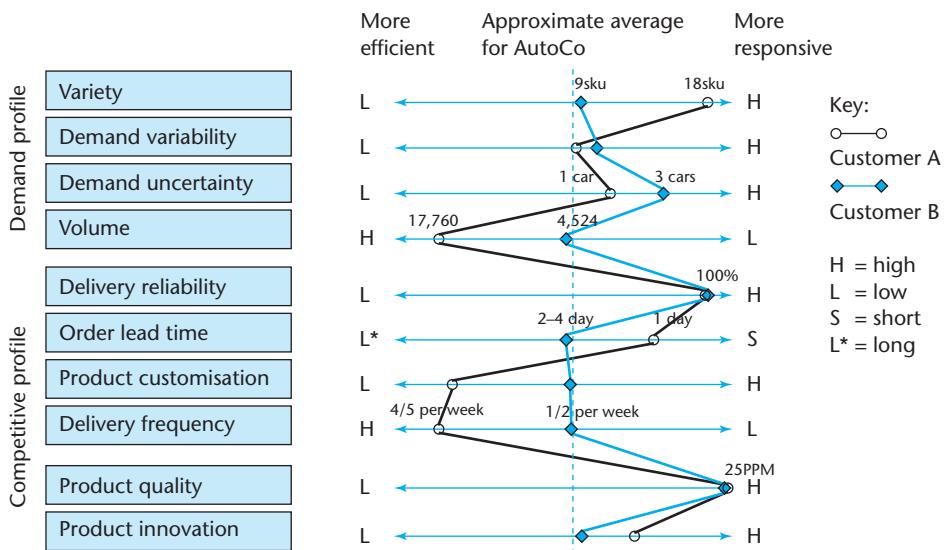


Figure 2.13 Strategy drivers and their implications for segmentation

Source: (Harrison, 2010)

customer A places priority on higher volumes on shorter delivery lead times with higher delivery frequencies. Customer B places priority on AutoCo's capability to meet uncertain demand, and on higher levels of customisation. It is now possible to describe the segments typified by customers A and B in terms of:

- buying behaviour relevant to logistics strategy;
- customer-perceived value;
- profile of logistics strategy drivers.

All other major customers at AutoCo then need to be evaluated in similar terms so that an overall segmentation strategy for the focal firm can be developed and refined. As indicated earlier, the aim is to develop a 'compromise' strategy that – like segmentation itself – seeks to describe logistics strategy 'as simply as possible while doing our best to emphasise its variety' (Millier and Palmer, 2000). Case study 2.6 gives you an opportunity to try out these concepts in the setting of a food supply chain.

CASE STUDY 2.6

Bacalao – two supply chains for two markets

Bacalao is fish that has been salted and dried, traditionally in the open air on rocks; today it is done in a drier. It has been produced in Norway since about 1640, can be kept refrigerated for several years, and is said to improve over time. It has developed a strong position in the food cultures of many Latin countries – such as Brazil, the Dominican Republic and Portugal – where consumers often follow the Catholic tradition of eating more fish on Fridays and in the run-up to Easter. Marketing over many years has created the association with Norway as 'the land of bacalao', or 'bacalhau da Noruega' as it is called. It is a matter of great pride among consumers to master a variety of recipes for serving bacalao.

The overall supply chain is illustrated in Figure 2.14. It takes at least four weeks to make the end product. The best fish is wild and taken by line, but trawled fish is also

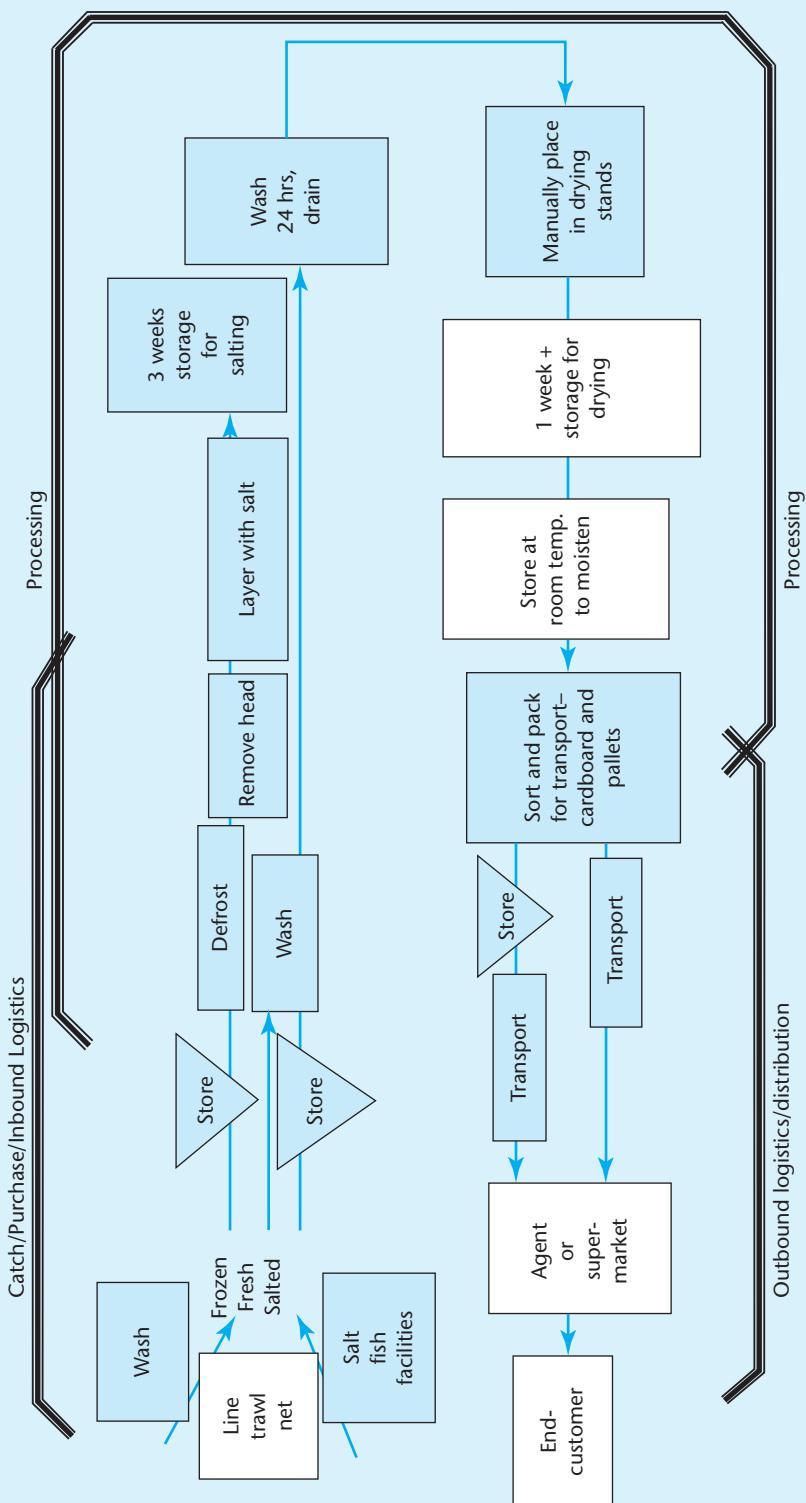


Figure 2.14 The overall supply chain for bacalao

Source: Jähne and Reifland-Fougner, 2005

good, while nets give the lowest quality because the fish can be dead for a while before being hauled up. Today, the fish is increasingly farmed as well. The raw material is the major cost item: prices are set by the Råfiskelaget (the Norwegian raw fish association). Prices can vary a lot – for example from NOK 26/kg to NOK 15/kg within a year. Electricity and insurance are the other two major cost items. The fish is slaughtered (and bled on boat for the best quality), then matured in salt for two to three weeks. After salting it is dried, sorted, packed and distributed. There are no reliable ways of measuring salt and water content, so manual methods of touching and feeling the fish during each stage are used to ensure consistent quality and weight.

Bacalao is mainly produced from cod, which is preferred by Portuguese customers. But consumers in the Dominican Republic prefer pollock, which is a darker-fleshed fish that is more abundant in the North Atlantic. Cod is up to three times more expensive than pollock. The Norwegian fish industry is highly fragmented, with many small-scale fish farmers, fishermen and producers. Marketing activities are coordinated by the Norwegian Seafood Export Council.

Consumers are very quality conscious when buying bacalao. Quality is determined by colour, texture and firmness, as well as water content and size. Portuguese consumers prefer smaller cod around 2.5 kilos, while consumers in the Dominican Republic are less concerned with size. Note that quality here refers to *grade* of fish rather than to conformance quality: both grades are fit for purpose in the markets they serve.

Bacalhau da Noruega

Company Noruega (CN) company has 150 employees, and built its bacalao production facility in 1997 in the port of Ålesund – which has one of the largest harbours in Norway and one of the most modern fishing fleets in Europe. The company focuses on volume in order to benefit from the economies of scale. Production is stabilised through the year by ensuring a stable supply of fish through sourcing a combination of frozen and fresh fish, creating a buffer of some three to four months supply. The company only trades in full truckloads, which are distributed via Hamburg or Rotterdam. Product is sold under the generic brand name of *Bacalao da Noruega* in standard transport packaging. While CN serves most Latin markets, 80 per cent of its sales go to the Dominican Republic as pollock bacalao. This market is relatively stable throughout the year, which matches CN's stable production policy. CN is experimenting with pollock farming further to improve supply reliability.

Bacalao Superior

Company Superior (CS) is also based in the Ålesund area, and accounts for 15–20 per cent of Norwegian bacalao exports to Portugal. Only cod bacalao is exported to this market, which commands a 10–15 per cent price premium over other Norwegian bacalao. The product is popular with consumers, which creates a strong relationship with the single supermarket chain that sells it. Fish are sold whole, with a CS tag showing guarantee of origin from fresh Norwegian cod, which was an idea that came from the supermarket customer. This ensures that CS bacalao stands out from other offerings. Joint marketing campaigns are funded by both CS and its supermarket customer, and include TV promotions. Only fresh cod is used in *bacalao superior*, caught by the coastal fleet in small boats. Supply is heavily dependent during the winter on quotas that are

permitted in the famous Lofoten fishing field in the far north. CS buys from three fresh cod suppliers, and from 15–20 suppliers of salt fish. Processing follows traditional routes, but some technology has been introduced into cutting and drying. Finished product is transported to Portugal in 22-tonne truck loads three times per week. Storage of finished product is in Lisbon at the customer's warehouse.

Comparing da Noruega and superior

Table 2.7 summarises some of the major differences between these two products.

Table 2.7 Comparing da Noruega and superior

Characteristic	da Noruega (Dominican Rep)	Superior (Portugal)
Raw material	<ul style="list-style-type: none"> ● Fresh/frozen pollock ● Different sizes ● Line/trawl/net/farm ● Continuous supply ● 3–4 months inbound stocks 	<ul style="list-style-type: none"> ● Fresh cod, some salted ● Size specific ● Mostly line ● Seasonal supply ● Small inbound stock
Production process	<ul style="list-style-type: none"> ● High volume ● Single facility ● All types of fish processed in a single factory: more efficient ● Undifferentiated packaging 	<ul style="list-style-type: none"> ● Customised ● Many dedicated facilities ● Cod only in single, focused factory ● Fish individually tagged
Marketing	<ul style="list-style-type: none"> ● Continuous consumption ● Generic marketing through Seafood Export Council ● Low price ● Generic packaging ● Little differentiation 	<ul style="list-style-type: none"> ● Special occasions ● Joint promotion with supermarket customer ● Premium price ● Branded to show origin ● Differentiated by market

CN accepts more variation in its raw material source to enable continuous supply. This applies to type of fish as well as where and how it is caught. Farming and a healthy stock of frozen fish help to reduce further supply variations. On the other hand, CS seeks the best quality with minimum variation. The only inbound stock that is permitted is small quantities of salted cod.

While the raw materials and end-product have many similarities, there are substantial differences in inbound and outbound logistics as well as processing and distribution strategies. These differences are fundamental to the need to support the brand (raising consumer expectations) by means of logistics strategy (meeting consumer expectations). We can conclude as follows:

- *Two fundamentally different inbound strategies:* CN focuses on secure, continuous supply and accepts greater variation in terms of type of fish, where and how caught – so farming is encouraged. They buffer and store extensively. CS goes for consistently high quality by not accepting much by way of variation: size, line catching and location are all important requirements. They do not store fresh fish or use frozen.
- *Internally consistent marketing and logistics:* CN matches the low price, continuous availability marketing mix by means of efficient sourcing and continuous availability, and of 'lean' (see Chapter 6) production and distribution methods. This enables

high and consistent production volumes supported by a flexible product mix. There is less to go wrong in terms of supply, but the generic nature of the product militates against better margins or customer loyalty. CS matches the high price, seasonal availability marketing mix by means of highly selective sourcing and by focused factory production that is seasonal and relatively inefficient. Production is possible only when high-quality, line-caught fresh fish are available. Limited and sporadic availability mean that the product has to reassert itself following supply interruptions, so the marketing pull must be consistent and strong. Traceability through tagging reinforces the superior quality image in consumers' minds, supported by joint marketing with the major retail customer.

The way that the two supply chains have evolved illustrates the *tradeoffs* at stake: more of one thing means less of another. The CS supply chain has become focused on top quality (grade) product, but at relatively high cost and sporadic availability. The CN supply chain has become focused on the opposite: low cost and continuous availability, but at average quality (grade).

Sources: Jahre and Refsland Fougner, 2005; Harrison, 2010

Question

- 1 Using Figures 2.12 and 2.13, summarise the key strategy drivers for products from CN and CS as far as you can with the information given in the case.

Summary

What is customer service in the context of logistics?

- Marketing is defined as 'the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, partners and society at large'. Loyal customers are seen as the source of profit, growth and security. Marketing in practice starts with analysing segments, evaluating those segments and targeting them. Segments need to be measurable, economically viable, accessible and actionable. Marketing in practice continues by market positioning, which requires differential advantage to be defined, and the marketing mix to be formulated.
- The key logistics contribution to the marketing mix is in the 'fourth P', place. This includes decisions about factors such as channel selection, market coverage, distribution systems and dealer support. Logistics also supports product decisions (for example, product range) and promotion activity.
- An important logistics contribution to putting the end-customer first is to forecast demand. This can be undertaken using judgemental forecasting (where no demand history exists) or by causal forecasting (where historical data are available).
- Business to business (B2B) refers to upstream relationships between members of a network. Business to customer (B2C) refers to handover to the end-customer. B2B relationships therefore need to be aligned towards B2C.

- Supply networks end with service processes, where the end-customer is present in some way. ‘Gaps’ can emerge between what the service is supposed to be, what the customer expects it to be, and how the customer perceives it when it is delivered. The size of these gaps has implications for quality of service, a major driver of customer loyalty.

How do we win and retain customers through logistics?

- The principle here is that loyal customers have many advantages over new ones. The logistics challenge is to reinforce loyalty by exceeding customer expectations via superior quality of service.
- Customer relationship management is based on the principle that marketing strategies should be continuously extended to strengthen customer loyalty. Phases of logistics development are needed, each phase placing increasing demands on the development of logistics capabilities.
- Setting logistics priorities should be carried out with market segments in mind. This is a joint task between marketing and logistics functions. Order winners and qualifiers by segment help develop a common language to assist this task.
- Often, the current approach to segmentation is unsatisfactory in logistics terms. We present a four-step model to diagnose the current approach, and to re-engineer that approach using the concept of logistics strategy drivers (demand profile and competitive profile).

Discussion questions

- 1 suggest ways in which logistics can play a part in the marketing mix for:
 - a manufacturer of cleaning products like CleanCo (Case study 2.4);
 - a retailer such as Tesco (Case study 1.1);
 - an automotive repair and recovery firm such as Talleres Auto (Case study 1.6);
 - food suppliers such as CN and CS (Case study 2.6).In each case, specify the organisation you have in mind and explain the reasons for your suggestions.
- 2 The ‘Batman’ case (Case study 2.5) presents what might be described as a ‘marketing wish list’. Analyse the likely logistics challenges at each stage of development, and suggest how these might be addressed.
- 3 While top companies such as IBM and Tesco say that the customer is king, will customer choice continue to be unrestrained in a) 2020 and b) 2050? Explain your thinking in each future state scenario.
- 4 Explain what is meant by uncertainty in demand forecasting.

The barbecue sauce focal firm described in section 2.3 has manufacturing facilities in the Netherlands which are described as ‘high on quality and reliability, but low on responsiveness’. In order to maximise production efficiency, large batches of each flavour are made so that process cleanouts (each lasting > four hours) are kept to a minimum. After manufacturing, each batch of a given flavour is transported to an

off-site finishing operation, where bottles of the different flavours are packed into a display box for attractive presentation to the end-customer at the firm's retail customers. This process takes an average of two weeks because of the need to ensure that all flavours are available. Finally, the display boxes are distributed through warehousing operations which have been situated in six carefully selected locations around the product's major European market in Germany.

Management of the focal firm is under pressure to reduce inventories and stock write-offs (the sauce has a shelf life of three months). Propose what actions could be taken to improve the supply chain to permit improved responsiveness to end-customer demand.

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