

EDITED BY
JOHN FERNIE | LEIGH SPARKS

LOGISTICS AND RETAIL MANAGEMENT

4TH EDITION

**EMERGING ISSUES AND NEW CHALLENGES
IN THE RETAIL SUPPLY CHAIN**



The Chartered
Institute of Logistics
and Transport



Logistics and Retail Management

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FOURTH EDITION



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Edited by
John Fernie & Leigh Sparks



LONDON PHILADELPHIA NEW DELHI

Publisher's note

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First published in Great Britain and the United States in 1999 by Kogan Page Limited

Second edition published in 2004

Third edition published in 2009

Fourth edition published in 2014

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2nd Floor, 45 Gee Street
London EC1V 3RS
United Kingdom
www.koganpage.com

1518 Walnut Street, Suite 1100
Philadelphia PA 19102
USA

4737/23 Ansari Road
Daryaganj
New Delhi 110002
India

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ISBN 978 0 7494 6823 1

E-ISBN 978 0 7494 6824 8

British Library Cataloguing-in-Publication Data

A CIP record for this book is available from the British Library.

Library of Congress Cataloging-in-Publication Data

Logistics and retail management : emerging issues and new challenges in the retail supply chain / [edited by] John Fernie and Leigh Sparks. – Fourth edition.

pages cm

ISBN 978-0-7494-6823-1 (pbk.) – ISBN 978-0-7494-6824-8 (ebook) 1. Business logistics.

2. Retail trade—Management. I. Fernie, John, 1948- II. Sparks, Leigh.

HD38.5.L614 2014

658.5—dc23

2013047710

Typeset by Graphicraft Limited, Hong Kong

Printed and bound in India by Replika Press Pvt Ltd

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Colin Temple joined Schuh in 1988, becoming Managing Director in 2002. He gained his initial experience in retailing at Woolworths with various merchandise roles. He has subsequently headed up two management buyouts at Schuh and oversaw the sale of the company in June 2011 to Genesco, a US Wall Street listed retailer. Schuh has a proven ability to engage young staff to offer excellence in customer service by promoting a 'can

do culture' overlaid with innovative use of technology to aid the customer journey. A focus on an efficient supply chain has ensured survival in difficult times and tangible levels of profitability in the normal economic cycle. Colin was early to market selling footwear online and from this base he has ensured that Schuh continues to perform well in the ever-changing multi/omni channel retail world. Under Colin's leadership Schuh is now recognized as being best in class in UK multiple fashion footwear. He firmly believes that business needs to be kept simple and manages Schuh by looking after the People (staff and customers), the Product (employ the best buyers) and the Processes (invest in bespoke systems) which leads to Profitability. He holds an Honorary Professorship at Heriot-Watt University and won the KPMG Male Business Leader of the Year Award in 2010.

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PREFACE

As educators involved in the teaching of logistics and the supply chain, particularly in the context of retailing, it is increasingly hard to convey to students how much things have changed in the retail supply chain, but also how many challenges remain. Many approaches and results are taken for granted and it is assumed that supply chains have always been at the forefront of retail innovation and have always delivered the goods. Nothing of course could be further from the truth. For a long time, the supply of products into retail outlets was controlled by manufacturers and was very much a hit or miss affair. Consumers had to put up with the product they found (or did not find) on the shelves and retailers and manufacturers operated in something of an efficiency vacuum. This situation has now been transformed. Retailers have recognized the need to have more involvement in supply chains and noted that benefits can be achieved in both service levels and cost reduction. Massive efforts have been made to reorganize and reprioritize activities in moving products from production to consumption. Notwithstanding the major strides made, some challenges remain, and new issues have emerged.

In 1990 John Fernie edited *Retail Distribution Management* for Kogan Page. This volume, one of the first to look explicitly at distribution (as it then was) in retailing, combined retail academic and practitioner studies and viewpoints to provide a glimpse into what was a fast-changing situation. This volume pointed to a revolution in logistical support to retail stores over the 1980s in the United Kingdom. Through academic work and practical case examples the volume showed how retailers were gaining control of supply chains and reorganizing their own operations, and those of manufacturers, suppliers and distribution specialists, to transform the flow of goods and information in supply chains. In the process, new forms of working using new technologies were improving the quality of products moving through the system, both in physical terms and in terms of time appropriateness. Through the building of relationships with supply partners, efficiency and effectiveness were introduced into previously inefficient and ineffective supply systems. From a concentration on functional silos in physical distribution and materials management, the logistics concept and a focus on end-to-end supply chains was developed.

By 1998, John Fernie and Leigh Sparks were in a position to put together a new edited volume, again combining academic and practitioner viewpoints on changes in the retail supply chain. This volume showed that the 1990s had experienced further change, mainly focused on incremental improvements and relationship change, though in some circumstances major one-off efficiency gains were still possible. Through the adoption of further technological developments and the integration of the entire retail supply chain,

costs were squeezed out of the system, yet at the same time service improvements were still possible.

The 1998 edited volume, by now entitled *Logistics and Retail Management*, became recommended reading in both academic and practitioner situations. It was no surprise therefore that the publishers, on seeing it go out of print, requested a revised second edition. Between 1998 and 2002 there was another transformation in many retail supply chains. Allied to changes in the retail sector itself, with global developments of supply and concentration, the supply of products took on new dimensions. This is not to say that the subject matter of retail logistics was totally changed. Many of the issues remained the same, but the way these were tackled, and the dimensions of the issues, altered. The second edition thus had only one chapter identical to the first edition. Some were lightly changed, as the issues remain broadly the same, but many were brand new and developed especially for the second edition.

The second edition was finally published in 2004 and was even more successful than its predecessors. It has been reprinted a number of times as well as translated into a number of different languages. In our afterword to the second edition we identified a number of challenges to retailers and their supply chains. These revolved around issues of availability, retailer control of channels, time in replenishment, technology (and in particular radio frequency identification – RFID) and e-tailing.

The third edition, published in 2009, picked up on many of these challenges, with most of the substantive changes occurring towards the end of the volume with new chapters on availability and on environmental issues. The chapters involving new technologies required considerable updating (e-tailing and RFID). Our earlier editions had a strong emphasis on the food sector, especially as UK companies were seen to be at the forefront of techniques and results. In the late 1990s, however, fashion retailers such as Zara showed how supply chain reorganization in non-food sectors can produce dramatic results and competitive advantage. This third edition reflected such a change with three chapters on fashion logistics to give a better range of examples across the various retail sectors. As before, this volume has had widespread national and international use and the time has come to produce a revised fourth edition.

In putting together this fourth edition, we have tried to remain faithful to the ethos of previous volumes, maintaining relevance and reflecting the changing dimensions of retail supply chains and logistics. This has involved removing chapters that have become dated and adding new chapters, especially in the fashion sector. The tragedy of the collapse of a building in Bangladesh in 2013 that hosted factories supplying Western fashion retailers threw into focus some of the corporate social responsibility (CSR) issues of an increasingly international supply chain. In addition to a CSR chapter we also have new chapters on the footwear supply chain and the luxury sector. The latter has defied the recession with continued growth over the last decade. Some chapters have been slightly revised. Major changes have

occurred in the chapters on e-tail logistics, on-shelf availability and the greening of retail logistics to reflect more recent research in these areas. The chapter on Tesco has been substantively updated and extended to reflect technological and environmental developments.

The opening chapter of the book (Retail logistics: changes and challenges) has been written by John Fernie and Leigh Sparks. The aim of this chapter is to provide a context for the remainder of the volume. It begins by pointing to the way in which many people tend to forget that supplying products and services is not necessarily a straightforward task. Rather, it is the managed integration of a range of tasks, both within and increasingly beyond the boundaries of the company. The traditional functional silos of warehousing and transport have been removed by the need to integrate the logistics tasks and to develop a stronger sense of supply chain management. Through a close examination of the needs in different situations and the development of techniques such as Quick Response (QR) and Efficient Consumer Response (ECR), leading to ideas of lean and agile supply systems, so effectiveness and efficiency has been attained in very different circumstances. This is not to say that challenges do not exist but rather to point to the great strides forward that have been taken. Retailers that have not critically examined their supply systems are now realizing that they need to catch up. To meet national and potentially global competitors, many retailers are re-examining their supply chains. Often the steps they are taking are not new, but rather have become the standards required of major retailers. Other retailers are recognizing that they also need to look at every aspect of their supply systems. This is certainly the case when retailers get involved in e-commerce, where challenges to efficiency are fundamental, and throughout supply systems when waste and environmental impact reductions are potential hazards for all retailers. One of the biggest areas of change for retailers has been the development of pan-company relationships. It has been remarked that retailers now compete not on the basis of their activities alone, but on the basis of the effectiveness and efficiency of their whole supply chain. If problems are present in production and primary distribution then these will inevitably have an effect on the price, quality and availability of the products on the shelves for consumers. Relationships in the supply chain are therefore now fundamental.

Analysis of these changing relationships form the basis of the second chapter, prepared by John Fernie. In this chapter key themes in relationships, such as power and dependence, trust and commitment and cooperation and co-opetition, are examined initially. Much of the emphasis on relationships in supply chains, as noted in the introductory chapter, has focused on the concepts of QR and ECR. These are analysed in detail in this chapter, along with ideas of collaborative planning, forecasting and replenishment. Finally, the role of third party logistics providers in helping retailers meet their strategic objectives is considered. As the retail logistics environment changes, so logistic service providers can capitalize on a range of opportunities. Towards the end of the chapter the concept of outsourcing is discussed in the context

of offshore sourcing as the logistics task widens from a national to a global perspective.

This theme is picked up in the next chapter. Globalization is an over-used term, but there can be no doubt that there has been a greater internationalization in retail supply, both in terms of the internationalization of the major retailers themselves and also in the sources of product supply. Chapter 3, by John Fernie, focuses therefore on the 'Internationalization of the retail supply chain'. In this chapter he points initially to the major changes that have occurred in the sourcing of products in recent decades. In both food and non-food there has been an increasing internationalization of product supply, developed both through the potential of low cost supply, but also simply because of the increasing international operations generally by major retailers. The early part of the chapter has been enhanced in this edition through a detailed discussion of the offshore sourcing literature and the role of international hubs and intermediaries in the textile supply chain. It is probably fair to say that internationalization is a better term than globalization in this area (as in some others) as it is clear that the distribution and supply practices ('culture') and infrastructure in different countries and parts of the world are substantially different. There is no global logistics approach that can be identified, though it is becoming increasingly clear that the growing internationalization of retailing is leading to the internationalization of logistics practices, both within retailers and through their supply partners. Perhaps the closest to a global approach can be found in some of the logistics services providers.

These first three chapters provide a context for the detailed studies that follow. Together they suggest that retail supply has been transformed in recent decades, not without problems in some cases. Chief among the issues being confronted by many retailers are the relationships throughout the supply chain and the increasing breadth in spatial terms of the sources of supply. The next five chapters provide illustrations of these issues in the non-food and food sectors.

Chapter 4 by Patsy Perry, John Fernie and Steve Wood entitled 'The international fashion supply chain and corporate social responsibility' further develops some of the themes discussed in the previous chapter. The internationalization of garment production has led to western retailers trading off longer lead times from offshore markets for considerable cost reductions in labour intensive parts of the production process. This has resulted in question marks being posed over the CSR implications of these strategies, highlighted by the Bangladeshi disaster mentioned earlier. The authors then show how Sri Lanka has initiated a 'Garments without Guilt' programme to ensure high levels of CSR compliance in factories supplying western retailers.

Although trends in the footwear supply chain mirror those in the clothing supply chain, the footwear supply chain is more complex and labour intensive than the clothing sector. John Fernie and Colin Temple explore these issues in Chapter 5, 'The footwear supply chain: the case of Schuh'. They discuss how similar trends are evident to those discussed in the previous

chapter – offshore sourcing and the use of the design, sourcing and distribution model (outsourcing). However, each season a supplier will produce 3,000–4,000 different models of shoes leading to 4,500–8,000 items being produced. The supply chain is therefore complex and long with lead times of over 200 days between the design of new collections to delivery to customers. The case study of Schuh highlights such lead times with buyers ordering stock for delivery in 6–9 month cycles. Schuh's success in the United Kingdom during the recession can partly be attributed to how the company manages its supply chain. If an item is fashionable, Schuh will stock it. It has a Best Store, Best Stock policy whereby stores are allocated stock that sells regardless of size of store. This is achieved through their state-of-the-art distribution centre that re-allocates stock daily and also manages distressed stock and the internet business. Schuh embraced online retailing from 2001; it was one of the first fashion companies to use eBay and offers consumers a variety of channels to both purchase and return shoes.

Despite the downturn of the global economy over the last five years, the one sector that has been relatively immune to recession has been the luxury sector and in particular the luxury fashion business. In Chapter 6, 'Supply chain strategy in the fashion and luxury industry', Alessandro Brun and Cecilia Castelli discuss the changes in the luxury fashion supply chain and the structure of the inbound/outbound supply chain prior to detailing their work on Italian luxury companies. They provide examples from three sectors – shoes, bags/suitcases and swimwear/underwear – to illustrate different supply chain configurations.

The case of Tesco has received considerable academic and practitioner attention over the last decades. Initially this was probably due to the very public transformation of the business that was being attempted. More recently this attention has been due to the success of this transformation and the growing realization that Tesco has been a pioneer in the supply chain and has developed a world-class logistics approach. To some extent this success was due to the particular circumstances in the United Kingdom, which allowed a conforming and standard retail offer to be serviced by a straightforward and regular supply system. Such circumstances no longer apply, as the market in the United Kingdom has been altered and Tesco themselves have become a much more multi-format and international retailer (and product sourcing has also become more international). Chapter 7 provides therefore a review of 'Tesco's supply chain management', written by Leigh Sparks, who has been involved in studying Tesco's logistics for a number of decades. Particular emphasis is placed on the need to change logistics and supply to reflect the changing nature of the retail operations. With the store component transformation of the business well known, the chapter considers the lesser visible developments for logistics and supply. One component of this is the way in which Tesco have been influenced by dimensions of lean supply in their thinking. At the same time the global nature of Tesco and its movement into non-food has complicated its supply and logistics

operations. Tesco has been pioneers in successful e-commerce operations and is now focusing attention on environmental developments in supply chains. With the global recession impacting the business, at home and abroad, the need for appropriate supply systems for changed consumer practices and demand has never been greater.

One of the key topics identified by retailers throughout the last 10 years as a major challenge is that of availability. If products are not available for sale then retailers struggle and consumers will be attracted to competitors that have availability and choice. Chapter 8 by John Fernie and David B Grant discusses 'On-shelf availability in UK retailing'. In the previous edition of the book the authors focused on the grocery sector drawing upon a case study of a major retailer. In this edition further research carried out by the authors is reported not only in the grocery sector but in clothing and other non-food sectors. They have provided a conceptual model for on-shelf availability (OSA) improvement. The model helps to explain why the OSA issue has been tackled in a more robust manner than in other sectors.

The final two chapters in the book take a somewhat different approach, by looking at aspects of technology use and environmental concerns in logistics. While technology is implicit in many of the chapters that have gone before, here the focus is more explicit. Similarly, many of the practices identified in the early chapters can be seen as having environmental or 'green' aspects, though the direction of impact varies considerably. Here again, the focus is made explicit.

The first of these chapters is by John Fernie, Suzanne Fernie and Alan McKinnon, who consider 'The development of e-tail logistics'. Non-store shopping is of course not new. Systems to deliver products to homes have been around for a long time. The late 1990s, however, saw massive hype around the development of e-commerce and predictions that over time (though this varied enormously) a significant proportion of retail sales would migrate to the internet. The collapse of the dot.com boom initially brought such claims into stark reality but the late 2000s/early 2010s has witnessed rapid growth rates in online shopping at the expense of offline shopping. The main changes discussed in this edition have been in the improvements in online interactivity with the advent of Web 2.0, social media and m-commerce. Retailers have had to respond to this anytime, anywhere culture in their ordering systems; however, many challenges remain in terms of unattended delivery and the 'last mile' problem. Retailers are communicating better with customers on the tracking of deliveries and are offering a variety of options for collecting and returning goods, such as Click and Collect and Collect Plus.

The final chapter in this volume is by Alan McKinnon and Julia Edwards and is entitled 'The greening of retail logistics'. Logistical activities are responsible for much of the environmental cost associated with modern retailing and it is thus not surprising that logistics is a key component of environmental strategy developed by retailers. This chapter examines the adverse effects of retail logistics on the environment and reviews a series of

measures that companies can take to minimize them. The authors conclude that large retailers have been a fertile source of logistical innovation and have pioneered many practices and technologies. However, many of the environmental costs of retail distribution currently are borne by the community at large and not by the retailer's balance sheet. If this changes, as seems likely, then those retailers already trying to minimize their logistical environmental footprint will have a significant financial advantage and will also probably be viewed more positively by consumers.

In any book on a topic as wide as retail logistics it is inevitable that some issues will be missed. We hope that those that we have included are of interest and demonstrate the complexity and challenge of modern retail logistics. As before we have resisted the temptation to have a chapter focusing on future issues. Product supply has been transformed in recent years. The only thing we can be reasonably sure of is that changes will continue to be made as retailers continue to search for the most appropriate systems and practices to meet the changing consumer and operational demands. As before, the future remains challenging and exciting.

John Fernie and Leigh Sparks
Scotland

Retail logistics: changes and challenges

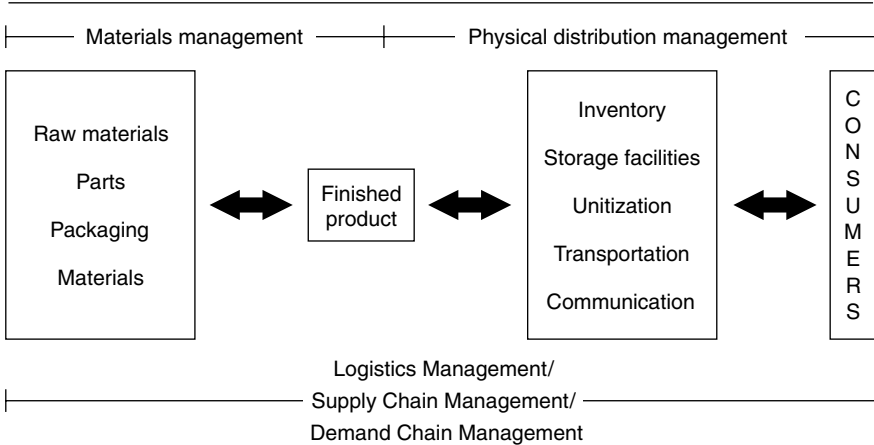
01

John Fernie and Leigh Sparks

It is often taken for granted that appropriate products will be available to buy in the shops. The cornucopia of goods that are available in a hypermarket or a department store sometimes means that we forget how the products were supplied or what demands are being met. We expect our lettuces to be fresh, the new iPad to be available on launch day and our clothes to be in good condition and ready to wear. With the advent of e- and m-commerce we have come to demand complete availability and delivery at times, and to places, of our choosing.

Consumer beliefs and needs have altered. How consumers behave and what we demand has changed. Our willingness to wait to be satisfied or served has reduced and we expect instant product availability and gratification. It should be obvious from this that the supply or logistics system that gets products from production through retailing to consumption has also had to be transformed. Physical distribution and materials management have been replaced by logistics management and a subsequent concern for the whole supply chain (Figure 1.1). This consideration for the supply chain as a whole has involved the development of integrated supply chain management. More recently there has been a concern to ensure that channels of distribution and supply chains are both anticipatory (if appropriate) and reacting to consumer demand, at general and detailed segment levels. There has also been a stronger realization of the need for reverse flows of data and product in supply chains, both to inform demand-driven supply and to ensure appropriate recycling, re-use and other handling and sustainable systems.

This transformation in conceptualization and approach derives from cost and service requirements as well as consumer and retailer change (see Fernie, 1990; Fernie and Sparks, 1998, 2004, 2009; Fernie, Sparks and McKinnon, 2010). Elements of logistics are remarkably expensive, if not controlled

FIGURE 1.1 From physical distribution management to demand chain management

effectively. Holding stock or inventory in warehouses just in case it is needed is a highly costly activity. The stock itself contains value and might not sell or could become obsolete. Warehouses and distribution centres (DCs) generally are expensive to build, operate and maintain. Vehicles to transport goods between warehouses and shops are not cheap, both in terms of capital and, increasingly, running costs. Building and managing data networks and data warehouses remains pricey, despite the huge cost reductions for equipment in recent years. There is thus a cost imperative to making sure that logistics is carried out effectively and efficiently, through the most appropriate allocation of resources along the supply chain.

At the same time, there can be service benefits. By appropriate integration of demand and supply, mainly through the widespread use of information technology and systems, retailers can provide a better service to consumers by, for example, having fresher, higher quality produce arriving to meet consumer demand for such products. With the appropriate logistics, products should be of a better presentational quality, could possibly be cheaper, have a longer shelf life and there should be far fewer instances of stock outs. Reaction time to 'spurts' in demand can be radically improved through the use of information transmission and dissemination technologies. If operating properly, a good logistics system can therefore both reduce costs and improve service, providing a competitive advantage for the retailer.

Increasingly, there is also an environmental or 'green' dimension to logistics and supply chains. This occurs in many situations and has become increasingly important. This importance is both externally and, to a degree, internally driven. Externally, the awareness of environmental and sustainability issues has increased exponentially and retailers have had to respond to these pressures, both voluntarily and under legal requirement. Internally, retailers have become more aware that the benefits of having a system that is efficient

and effective in meeting consumer demands can generate environmental benefits. Being environmentally sensible can also sometimes improve efficiency and effectiveness. This is clearly not always the case, but doing logistics ‘properly’ can bring benefits for all (eg less miles, reduced packaging). This is predicated on being fully aware of the impacts of decisions in logistics and on correctly mapping the processes and activities from both a supply and a demand point of view.

As might be anticipated, as the practical interest and involvement in retail supply chains has risen, so too academic consideration has expanded. Previous editions of this volume have garnered considerable interest and throughout the 2000s texts explicitly on the retail supply chain have been produced (Kotzab and Bjerre, 2005; Hugos and Thomas, 2006; Ayers and Odegaard, 2008; Fisher and Raman, 2010; Levesque, 2011). Our revised edition continues to develop the subject. This chapter sets the scene for the changes and challenges confronting retailers and their supply chains.

The logistics task

Retailing and logistics are concerned with product availability. Many have described this as ‘getting the right products to the right place at the right time’. Unfortunately, however, that description does not do justice to the amount of effort that has to go into a logistics supply system and the multitude of ways that supply systems can go wrong. The very simplicity of the statement suggests logistics is an easy process. The real management ‘trick’ is in making product availability look easy, day in and day out, while understanding consumer demand and reacting to its sometimes volatile dimensions, especially in our always-on multichannel era.

For example, if the temperature rises and the sun comes out in an untypical Scottish summer, then demand for ice cream, soft drinks and even salad items rises dramatically. How does a retailer anticipate this, make sure they remain in stock and satisfy this perhaps transient demand? Or how about Valentine’s Day, when demand for certain products in the days before increases exponentially? If a retailer stocks Valentine’s cards and demand does not materialize, then the retailer has stock that will not sell. There is little demand for Valentine’s cards on 15 February. While over-stocks in this case will not perish, the cost of their storage and handling for the intervening year can be considerable.

The examples above demonstrate that retailers must be concerned with the flows of product *and* information both within the business and in the wider supply chain. In order to make products available retailers have to manage their logistics in terms of product movement and demand management. They need to know what is selling in (and through) their stores and their websites and both anticipate and react quickly to changes in this demand. At the same time they need to be able to move less demand-volatile products in an efficient and cost-effective manner.

The logistics management task is therefore initially concerned with managing the components of the 'logistics mix'. We can identify five components:

- 1** *Storage facilities*: these might be warehouses or DCs or simply the stock rooms of retail stores. Retailers manage these facilities to enable them to keep stock in anticipation of, or to react to, demand for products.
- 2** *Inventory*: all retailers hold stock to some extent. The question for retailers is the amount of stock or inventory (finished products and/or component parts) that has to be held for each product and the location of this stock to meet demand changes.
- 3** *Transportation*: most products have to be transported in some way at some stage of their journey from production to consumption. Retailers therefore have to manage a transport operation that might involve different forms of transport, different sizes of containers and vehicles and the scheduling and availability of drivers and vehicles.
- 4** *Unitization and packaging*: consumers generally buy products in small quantities. They sometimes make purchase decisions based on product presentation and packaging. Retailers are concerned to develop products that are easy to handle in logistics terms, do not cost too much to package or handle, yet retain their selling ability on the shelves.
- 5** *Communications*: to get products to where retailers need them, it is necessary to have information, not only about demand and supply, but also about volumes, stock, prices and movements. Retailers have thus become increasingly concerned with being able to capture data at appropriate points in the system and to use that information to have a more efficient and effective logistics operation.

It should be clear that all of these elements are inter-linked. In the past they were often managed as functional areas or 'silos' and while potentially optimal within each function, the business as a whole was sub-optimal in logistics terms. More recently the management approach has been to integrate these logistics tasks and reduce the functional barriers. So, if a retailer gets good sales data from the checkout system, then this can be used in scheduling transport and deciding levels and locations of stock holding. If the level of inventory can be reduced, then perhaps fewer warehouses are needed. If communications and transport can be effectively linked, then a retailer can move from keeping stock in a warehouse to running a DC which sorts products for immediate store delivery, ie approaching a 'stockless' system. If standardized decisions about handling systems are made then the physical handling system can be built around them, facilitating movement and aiding re-usability. Internal integration has therefore been a major concern.

It should also be clear, however, that retailers are but one part of the supply system. Retailers are involved in the selling of goods and services to the consumer. For this they draw upon manufacturers to provide the necessary products. They may out-source certain functions, eg transport, warehousing, to specialist logistics services providers. Retailers therefore have a direct

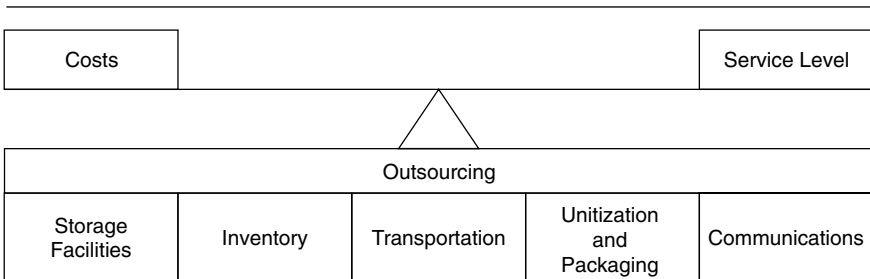
interest in the logistics systems of their suppliers and other intermediaries. If a retailer is effective, but its suppliers are not, then errors and delays in supply from the manufacturer or logistics services provider will impact the retailer and the retailer's consumers, either in terms of higher prices or stock-outs (no products available on the store shelves). If a retailer can integrate effectively its logistics system with that of its suppliers, then such problems may be minimized. Much more importantly, however, the entire supply chain can then be optimized and managed as a single entity. This brings potential advantages of costs reduction *and* service enhancement, not only for the retailer, but also for the supplier. It should also mean that products reach the stores and thus potentially consumers more rapidly, thus better meeting sometimes-transient customer demand. In some instances it may mean the production of products in merchandisable-ready units, which flow through the distribution systems from production to the shop floor without the need for assembly or dis-assembly. Such developments clearly require supply chain cooperation and coordination (Gustafsson *et al*, 2006).

We may be describing highly complex and advanced operations here. Retail suppliers have been increasingly spread across the world. A retailer may have thousands of stores in a number of countries, with tens of thousands of individual product lines. They may make millions of individual sales per day. Utilizing data to ensure effective operation among retailers, manufacturers, suppliers, logistics services providers, head office, shops and DCs is not straightforward. There is thus always a tension between overall complexity and the desire for the simplest possible process.

Managing the logistics mix in an integrated retail supply chain, while aiming to balance cost and service requirements, are the essential elements of logistics management (Figure 1.2). As retailers have begun to embrace this logistics approach and examine their wider supply chains, many have realized that to carry out logistics properly, there has to be a transformation of approach and operations (Sparks, 1998, 2010).

It is also important to be aware of the dangers of an internally focused supply chain or set of logistics operations. The 'tipping point' in Figure 1.2 is between cost and service and it is always important to ensure that the appropriate balance is achieved between these. If the system is too cost

FIGURE 1.2 The management task in logistics



focused then it may not meet the consumer demands, with potentially dire business consequences (eg Walters and Rainbird, 2004). Being aware of consumer demands and requirements is vital. Conversely, too much focus on consumer demands and the provision of too high service levels will cause cost problems for retailers. If the system is too responsive at any price, then again the operation is likely to be unsustainable. The transformation in retail supply chains is thus about appropriate balances and activities and the right approach to supply and demand.

Retail logistics and supply chain transformation

Retailers were once effectively the passive recipients of products, allocated to stores by manufacturers in anticipation of demand. Today, retailers are the active designers and controllers of product supply in reaction to known customer demand. They control, organize and manage the supply chain from production to consumption. This is the essence of the retail logistics and supply chain transformation that has taken place during the last 20–30 years.

Times have changed and retail logistics has changed also. Retailers are the channel captains and set the pace in logistics. Having extended their channel control and focused on efficiency and effectiveness, retailers are now attempting to engender a more cooperative and collaborative stance in many aspects of logistics. They are recognizing that there are still gains to be made on standards and efficiency, but that these are probably only obtained as channel gains (ie in association with manufacturers and logistics services providers) rather than at the single firm level.

In 1996, Alan McKinnon reviewed and summarized the key components required for this retail logistics transformation. He identified six closely related and mutually reinforcing trends:

- 1 *Increased control over secondary distribution:*** retailers have increased their control over secondary distribution (ie warehouse to shop) by channelling an increasing proportion of their supplies through DCs. In some sectors such as food this process is now virtually complete. British retailers exert much tighter control over the supply chain than their counterparts in many other countries. Their logistical operations are heavily dependent on information technology (IT), particularly the large integrated stock replenishment systems that control the movement and storage of an enormous number of separate products.
- 2 *Restructured logistical systems:*** retailers have reduced inventory and generally improved efficiency through, for example, the development of ‘composite distribution’ (the distribution of mixed temperature items through the same DC and on the same vehicle) and centralization in specialist warehouses of slower moving stock. In the case of mixed

retail businesses the establishment of 'common stock rooms' (where stock is shared across a number of stores, with demand deciding to which store stock is allocated) is developed.

- 3** *Adoption of 'Quick Response' (QR):* the aim has been to cut inventory levels and improve the speed of product flow. This has involved reducing order lead time and moving to a more frequent delivery of smaller consignments both internally (between DC and shop) and externally (between supplier and DC). This has greatly increased both the rate of stock-turn and the amount of product being 'cross-docked', rather than stored at DCs. QR (Lowson *et al*, 1999) was made possible by the development of Electronic Data Interchange (EDI) and Electronic Point of Sale, the latter driving the 'Sales Based Ordering' systems that most of the larger retailers have installed. In other words, as an item is sold and scanned in a shop, this information is used to inform replenishment and re-ordering systems and thus react quickly to demand. Sharing such data (sometimes in real time) with key suppliers further integrates production with the supply function. Major British retailers have been faster to adopt these technologies than their counterparts in other European countries, though they still have to diffuse to many small retail businesses.
- 4** *Rationalization of primary distribution (ie factory to warehouse):* partly as a result of QR pressures and partly as a result of intensifying competition, retailers have extended their control upstream of the DC (ie from the DC to the manufacturer). In an effort to improve the utilization of their logistical assets, many have integrated their secondary and primary distribution operations and run them as a single 'network system'. This reduces waste and improves efficiency, especially when extensive use of back-hauling and front-hauling is adopted.
- 5** *Increased return flow of packaged material and handling equipment for recycling/re-use:* retailers have become much more heavily involved in this 'reverse logistics' operation. This trend has been reinforced by the introduction of the EU Packaging Directive. Although the United Kingdom currently lags behind other European countries, particularly Germany, in this field, there remain opportunities to develop new forms of re-usable container and new reverse logistics systems to manage their circulation.
- 6** *Introduction of Supply Chain Management (SCM) and Efficient Consumer Response (ECR):* having improved the efficiency of their own logistics operations, many retailers have begun to collaborate closely with suppliers to maximize the efficiency of the retail supply chain as a whole. SCM (and within this, ECR) provide a management framework within which retailers and suppliers can more effectively coordinate their activities. The underpinning technologies for SCM and ECR have been well established in the United Kingdom, so conditions have been ripe for such developments.

It is clear that many of these trends identified in McKinnon (1996) have been the focus for retailers in the intervening decade or so. Issues such as primary distribution and factory gate pricing (FGP), consolidation centres and stockless depots and Collaborative Planning, Forecasting and Replenishment (CPFR) have occupied much attention. The overall focus in retail logistics has been altered from an emphasis on the functional aspects of moving products to an integrative approach that attempts to develop end-to-end supply chains. This outcome is normally referred to as supply chain management.

Supply chain management (SCM)

The roots of SCM are often attributed to Peter Drucker and his seminal 1962 article on 'the economy's dark continent'. At this time he was discussing distribution as one of the key areas of business where major efficiency gains could be achieved and costs saved. Then, and through the next two decades, the supply chain was still viewed as a series of disparate functions. Once the functions began to be integrated and considered as a supply chain rather than separately, several key themes emerged:

- a shift from a push to a pull, ie a demand, driven supply chain;
- customers gaining more power in the marketing channel;
- an enhanced role of information systems to gain better control of the supply chain;
- the elimination of unnecessary inventory in the supply chain; and
- a focus upon core capabilities and increased outsourcing of non-core activities to specialists.

To achieve maximum effectiveness of supply chains, it became clear that integration, ie the linking together of previously separated activities within a single system, was required. Companies have had therefore to review their internal organization to eliminate duplication and ensure that total costs can be reduced, rather than allow separate functions to control their costs in a sub-optimal manner. Similarly, supply chain integration can be achieved by establishing ongoing relationships with trading partners throughout the supply chain.

In industrial markets supply chain integration focused upon the changes promulgated by the processes involved in improving efficiencies in manufacturing. Total quality management, business process re-engineering and continuous improvement brought Japanese business thinking to western manufacturing operations. The implementation of these practices was popularized by Womack *et al's* (1990) book *The Machine that Changed the World*, which focused on supply systems and buyer–seller relationships in car manufacturing. In a retail context it is claimed that food retailers such as Tesco have increasingly embraced such lean principles for parts of their

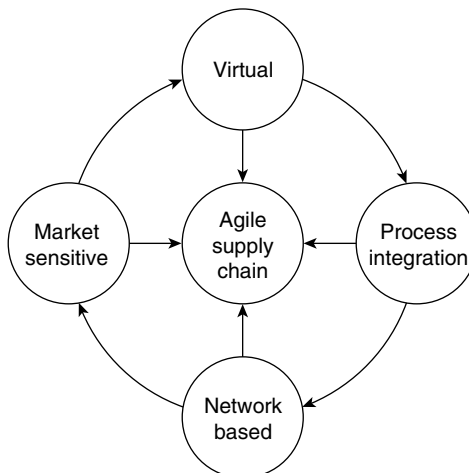
business (eg Jones, 2002; Leahy, 2012). The update by Womack and Jones (2005) of the state of ‘lean solutions’ puts retailing (or at least some retailers) at the heart of the changes underway.

During the 1990s this focus on so-called ‘lean production’ was challenged in the United States and the United Kingdom, because of an over-reliance on efficiency measures (‘lean’) rather than innovative (‘agile’) responses. Agility as a concept was developed in the United States in response to the Japanese success in lean production. Agility plays to US strengths of entrepreneurship and information systems technology. An agile supply chain (Figure 1.3) is highly responsive to market demand. Harrison *et al* (1999) argue that the improvements in the use of information technology to capture ‘real time’ data means less reliance on forecasts and creates a virtual supply chain between trading partners. By sharing information, process integration takes place between partners who focus upon their core competencies. The final link in the agile supply chain is the network where a confederation of partners structure, coordinate and manage relationships to meet customer needs (Aldridge and Harrison, 2000).

Both approaches of course have their proponents. There is, however, no reason why supply systems may not be a combination of both lean and agile approaches, with each used when most appropriate (the so-called ‘leagile’ approach – Mason-Jones *et al*, 2000; Naylor *et al*, 1999; Towill and Christopher, 2002). Table 1.1 provides a summary comparison of lean, agile and leagile supply chains (Agarwal *et al*, 2006). It can be seen that each have value in particular circumstances.

It can be suggested that the key concepts within SCM include the value chain, resource-based theory of the firm, transaction cost economics and network theory. The thrust of all these concepts is the obtaining of competitive

FIGURE 1.3 The agile supply chain

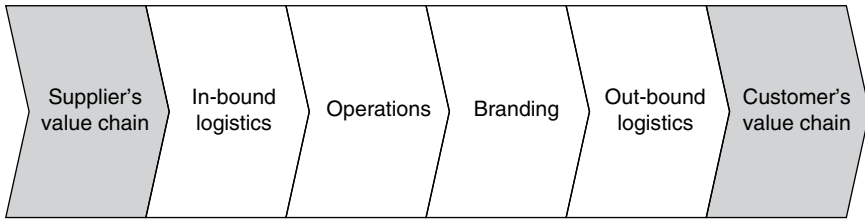


SOURCE: Harrison and van Hoek, 2002, p 174

TABLE 1.1 Comparison of lean, agile, and leagile supply chains

Distinguishing attributes	Lean supply chain	Agile supply chain	Leagile supply chain
Market demand	Predictable	Volatile	Volatile and unpredictable
Product variety	Low	High	Medium
Product lifecycle	Long	Short	Short
Customer drivers	Cost	Lead-time and availability	Service level
Profit margin	Low	High	Moderate
Dominant costs	Physical costs	Marketability costs	Both
Stock out penalties	Long term contractual	Immediate and volatile	No place for stock-out
Purchasing policy	Buy goods	Assign capacity	Vendor managed inventory
Information enrichment	Highly desirable	Obligatory	Essential
Forecast mechanism	Algorithmic	Consultative	Both/either
Typical products	Commodities	Fashion goods	Product as per customer demand
Lead-time compression	Essential	Essential	Desirable
Eliminate muda	Essential	Desirable	Arbitrary
Rapid reconfiguration	Desirable	Essential	Essential
Robustness	Arbitrary	Essential	Desirable
Quality	Market qualifier	Market qualifier	Market qualifier
Cost	Market winner	Market qualifier	Market winner
Lead-time	Market qualifier	Market qualifier	Market qualifier
Service level	Market qualifier	Market winner	Market winner

SOURCE: Agarwal *et al* (2006), p 212

FIGURE 1.4 The extended value chain

advantage through managing the supply chain (ie within and beyond the single firm) more effectively. They all explore possible benefits of a pan-firm orientation. Figure 1.4 illustrates a supply chain model showing how value may be added to the product through manufacturing, branding, packaging, display at the store and so on. At the same time, at each stage cost is added in terms of production costs, branding costs and overall logistics costs. The aim for retailers (and their supply partners) is to manage this chain to create value for the customer at an acceptable cost. The managing of this so-called 'pipeline' has been a key challenge for logistics professionals, especially with the realization that the reduction of time not only reduced costs, but also gave competitive advantage.

According to Christopher and Peck (2003) there are three dimensions to time-based competition that must be managed effectively if an organization is going to be responsive to market changes. These are:

- time to market: the speed at bringing a business opportunity to market;
- time to serve: the speed at meeting a customer's order; and
- time to react: the speed at adjusting output to volatile responses in demand.

Christopher and Peck (2003) use these principles to develop strategies for strategic lead-time management. By understanding the lead times of the integrated web of suppliers necessary to manufacture a product, they argue that a 'pipeline map' can be drawn to represent each stage in the supply chain process from raw materials to customer. In these maps it is useful to differentiate between 'horizontal' and 'vertical' time. Horizontal time is time spent on processes such as manufacture, assembly, in-transit or order processing. Vertical time is the time when nothing is happening, no value is added but only cost and products/materials are standing as inventory.

It was in fashion markets that the notion of 'time-based competition' had most significance, in view of the short time window for changing styles. In addition, the prominent trend in the last 20 years has been to source products globally, often in low-cost Pacific Rim nations, which lengthened the physical supply chain pipeline. These factors combined to illustrate the trade-offs that have to be made in SCM and suggested an imperative to

develop closer working relationships with supply chain partners, whether local or distant. The fast fashion retailers that have embraced time-based competition have fallen into two categories: those without factories (H&M, Top Shop) and the well documented vertically integrated firms (Zara and Benetton) with their unique business models (Tokatli, 2008; Lopez and Fan, 2009; Fernie and Perry, 2011; Bhardwaj and Fairhurst, 2010).

Zara broke the traditional four seasons collections and 'slow' fashion that dominated the high street. By the 1990s it had invested heavily into an information and logistics infrastructure that allowed it to respond quickly to the latest fashion trends (Ferdows *et al*, 2004). New ideas and fashion trends were evaluated so that around 11,000 items were selected from 30,000 designs. These were then produced in house with the labour-intensive finishing stages being contracted to nearby Spanish and Portuguese suppliers. Lead times were 3–6 weeks and stores received products twice a week from its 500,000 square metre DC based at its headquarters at La Coruña. More importantly, store managers monitored sales through hand-held monitors so that the correct quantities of stock could be allocated across the store portfolio. This meant that Zara offered a wider range yet a lower inventory than its competitors. It played upon the notion of freshness and originality, thereby creating a feeling of exclusivity. It is not surprising, therefore, that customers visited Zara's stores more frequently than the competition.

The success of Zara and its business model built up expectations that the drift to offshore sourcing could be reversed and create a revival of production in industrialized economies. Tokatli (2008) claims that these hopes were overestimated in that Zara by the early 2000s had already produced more than half of its products away from its traditional Iberian base and that this has intensified with the globalization of its store network. Furthermore, she questions the moral stance of domestic production in that seamstresses in Galicia and Portugal were earning less than the average industrial wage.

Another catalyst for many of the initiatives in lead-time reduction came from work undertaken by Kurt Salmon Associates (KSA) in the United States in the mid-1980s. KSA were commissioned by US garment suppliers to investigate on how they could compete with Far East suppliers. The results were revealing in that the US-based supply chains were long (one and a quarter years from loom to store), badly coordinated and inefficient (Christopher and Peck, 1998). The concept of QR was therefore initiated to reduce lead times and improve coordination across the apparel supply chain. In Europe, QR principles have been applied across the clothing retail sector. Supply base rationalization has been a feature of the last 10 to 15 years as companies have dramatically reduced the number of suppliers and have worked much closer with the remaining suppliers to ensure more responsiveness to the market place.

Complex webs of relationships have been formed in many supply chains. This has led Christopher and Peck (2003) to claim that as an outcome of SCM there is a strong case for arguing that individual companies no longer

compete with other standalone companies, but rather, that supply chain now competes against supply chain.

In many supply chains, tiers of suppliers have been created to manufacture specific component parts. Other supplier associations have been formed to coordinate supply chain activities. In these businesses the trend has often been to buy rather than make and to outsource non-core activities. Benetton (see Box 1.1), which has been hailed as the archetypal example of a network organization, is however bucking this trend by increasing vertical integration and ownership of assets in the supply chain (Camuffo *et al*, 2001).

Box 1.1 The Benetton Group

The Benetton Group has around 6,500 shops in 120 countries, manufacturing plants in Europe, Asia, the Middle East and India, and revenues of more than 2 billion Euros. It has divested its sportswear brands and now focuses its interests in fashion clothing, mainly casual wear, with the key brands of United Colors of Benetton, Undercolors of Benetton and Sisley.

Much of Benetton's success until the 1990s could be attributed to its innovative operations techniques and the strong network relationships that it has developed with both its suppliers and distributors. Benetton pioneered the 'principle of postponement', whereby garment dyeing was delayed for as long as possible in order that decisions on colour could be made to reflect market trends. At the same time, a network of subcontractors (small- to medium-sized enterprises) supplied Benetton's factories with the labour-intensive phases of production (tailoring, finishing and ironing) while the company continued to manufacture the capital-intensive parts of the operation (weaving, cutting, dyeing, quality control) in Treviso in north-eastern Italy. In terms of distribution, Benetton sells its products through agents, each responsible for developing a market area. These agents set up a contract relationship, similar to a franchise, with the owners who sell the products.

Benetton is now beginning to transform its business by retaining its network structure but changing the nature of the network. Unlike most of its competitors, it is increasing vertical integration within the business. As volumes have increased, Benetton set up a production pole at Castrette nears its headquarters. To take advantage of lower labour costs, Benetton has located foreign production poles, based on the Castrette model, initially in Spain, Portugal (now closed), Hungary, Croatia, Tunisia, India and Turkey and more recently through its Asia Pacific subsidiary production in China

and south-east Asia through Hong Kong and Bangkok. Castrette produces the designs for production in the regional poles. These foreign production centres often focus on one type of product utilizing the skills of the region.

In order to reduce time throughout the supply chain, Benetton has increased upstream vertical integration by consolidating its textile and thread supplies so that 85 per cent is controlled by the company. This means that Benetton can speed up the flow of materials from raw material suppliers through its production poles to ultimate distribution from Italy to its global retail network.

The retail network and the products on offer have also experienced changes. Benetton had offered a standard range in most markets but allowed for 20 per cent of its range to be customized for country markets. Now, to communicate a single global image, Benetton is allowing only 5–10 per cent of differentiation in each collection. Furthermore, it has streamlined its brand range to focus on the United Colors of Benetton and Sisley brands.

The company is also changing its store network to enable it to compete more effectively with its international competitors. It is enlarging its existing stores, where possible, to accommodate its full range of these key brands. Where this is not possible, it will focus on a specific segment or product. Finally, it has opened more than 100 megastores worldwide to sell the full range, focusing on garments with a high styling content. These stores are owned and managed solely by Benetton to ensure that the company can maintain control downstream and be able to respond quickly to market changes.

Walters and Rainbird (2004) conclude that if companies focus too much on the cost implications of supply chain management, then they over-emphasize cost efficiency at the expense of meeting consumer demands (ie the service dimensions). Arguably this may have been the situation in Tesco in recent years, recognized by the company saying that they ran the business 'too hot'. As supply chains have become complex webs and networks with tiers of suppliers to be managed then the business answer to this complexity is to focus on cost efficiency. Walters and Rainbird (2004) argue that firms will be better placed if they combined their supply chain capabilities with demand chain effectiveness. They suggest that demand chains, which focus on demand, customers and markets and current and potential products and services are vital for businesses, including retailers. As Table 1.2 suggests, there are differences between supply and demand chain processes and approaches. Others might argue that effective and efficient supply chains by definition include demand chain considerations. Walters (2006a, 2006b) presses the demand chain argument, and Canever *et al* (2008) provides an example of

TABLE 1.2 Supply and demand chain comparison

Supply chain	Demand chain
Efficiency focus; cost per item	Effectiveness focus; customer-focused, product-market fit
Processes are focused on execution	Processes are focused more on planning and delivering value
Cost is the key driver	Cash flow and profitability are the key drivers
Short-term oriented, within the immediate and controllable future	Long-term oriented, within the next planning cycles
Typically the domain of tactical manufacturing and logistics personnel	Typically the domain of marketing, sales and strategic operations managers
Focuses on immediate resource and capacity constraints	Focuses on long-term capabilities, not short-term constraints
Historical focus on operations planning and controls	Historical focus on demand management and supply chain alignment

SOURCE: Langabeer and Rose, 2001, in Walters, 2006b

the approach. All, however, recognize the links between supply and demand chain concepts. Here we intend SCM to mean incorporating a demand orientation and balance, and to include appropriate lean and agile principles, as shown below in the UK retail grocery chain.

The grocery retail supply chain in the United Kingdom

The food retail supply chain has attracted much attention in the United Kingdom partly because of the power of the major grocery retailers but also because of the influence of IGD, the main trade body that provides the medium for addressing key supply chain issues (see IGD.com; Bourlakis and Weightman, 2004; Fernie, Sparks and McKinnon, 2010). The development of SCM and the consequent implementation of relationship initiatives

have been identified as the fourth and final stage of the evolution of grocery logistics in the United Kingdom (Ferne *et al*, 2000). This relationship stage relates to a more collaborative approach to SCM after decades of confrontation. The UK is often mooted to have the most efficient grocery supply chain in the world and this is a key contributor to the profit margins of its grocery retailers.

This logistical transformation of UK retailing has occurred in a short period of time (Sparks 1998, 2010). In the first stage of evolution (pre-1980) the dominant method of distribution to stores was by manufacturers that stored products at their factories or field warehouses for multiple drops to numerous small shops. As the retail multiple gained in prominence (especially after the abolition of resale price maintenance in 1964), retailers invested in regional distribution centres to consolidate deliveries from suppliers for onward delivery to stores. This was the first step change in the supply of fast moving consumer goods in that buying and distribution became a headquarter function in retailing and the logistical infrastructure created a market for third party logistics service providers.

To all intents and purposes, this marked the removal of suppliers from controlling the supply chain. This period of centralization throughout the 1980s enabled retailers to reduce lead times, minimize inventory and give greater product availability to customers in their stores. The 1990s witnessed a consolidation of this process. In many cases inventory had only been moved from store to DC. By implementing just in time (JIT) principles, retailers began to focus on their primary distribution networks (from supplier to DC) demanding more frequent deliveries of smaller quantities. Clearly this created a problem for many suppliers in that they could not deliver full vehicle loads of product. To ensure that vehicle utilization could be maximized, consolidation centres have been created upstream of the DC and retailers have established supplier collection programmes to pick up products from suppliers' factories on return trips from stores.

In the first decade of this century, retail networks have continued to be upgraded as ECR initiatives were enacted and grocery retailers accommodated the increase in non-food products through their DCs. Furthermore, the greater sharing of information, especially through internet exchanges, has fostered CPFR initiatives to reduce supply chain response times. This has led to full integration of primary and secondary distribution networks.

It should be stressed that UK grocery retail logistics is relatively unique. Retailers not only control the supply chain but also have taken over marketing responsibilities that were once the sole domain of the manufacturer, eg product development, branding, advertising and distribution. The high level of retail brand penetration has enabled them to build up store loyalty and diversify into other businesses such as banking. Control of channels is a way of life for such companies and is one aspect of their international developments as well.

In other countries a more fragmented store offering is apparent and different store choice attributes are evident. For example, price and promotions

are key drivers of consumer choice in the United States, Germany and France when compared with the United Kingdom. This means the consumer buys in bulk and the retailer ‘forward buys’ promotional stock that needs to be housed in DCs. Of course in these markets land and property costs are relatively low compared with the United Kingdom, so that the savings in buying costs can outweigh the additional logistics costs. When Safeway (prior to the takeover by Morrisons in 2004) in the UK adopted a high/low promotional strategy in order to compete with Asda (Wal-Mart), this led to significant disruption and changes in the operation of its DC network.

It is also true that not all British grocery retailers have had a smooth ride when it comes to their supply systems. There is little doubt that Tesco has led the way (Smith, 2006; Smith and Sparks, 2004, 2009) and that their success has put pressure on their competitors. This pressure has been felt in directly competitive ways and also in terms of perceptions of supply chains. As Tesco continued its journey in terms of supply chains, others struggled to catch up. Asda endured a transformative period as Wal-Mart systems were introduced (Sparks, 2011). Morrisons had to spend a lot of time and effort on getting the merger with Safeway managed successfully, including in supply and logistics terms. Perhaps most dramatically, Sainsbury decided to go for an advanced technical and technological re-organization of its supply chain. Box 1.2 provides some of the details of the issues they faced and the ultimately disastrous consequences that ensued, and that then had to be recovered from. Perhaps what this shows most strongly is that supply chains and logistics systems have to evolve constantly to meet the changing supply and demand situations and that supply chains have to consider the demand requirements of consumers. Being satisfied with the current situation is not an option, especially as the ‘current situation’ has been so affected in recent years by the global recession, the rise of internet shopping (including mobile) and higher levels of environmental concerns.

Box 1.2 Sainsbury’s: Supply chain transformation goes wrong

In 2000 a study of Sainsbury’s supply chain revealed starkly what had become obvious – the company was operating outdated systems and facilities in its supply chain and these were adding to its costs and substantially under-performing its rivals. As a consequence, the new CEO opted for a new ‘all-or-nothing’ supply chain re-engineering strategy involving network renewal, systems and technology, and pressures and partnerships. This would involve:

- replacing the current depots with automated fulfilment factories and a primary consolidation centre;

- an integrated management of transportation from the factory gate to the store back door;
- replacing of core supply chain systems which were old and inflexible;
- ensuring clear performance measurement by reorganizing the supply chain structure and processes.

The new system would be paperless, stockless, accurate, simple and automated where appropriate. Martin White, the Director of Supply Chain, stated the task in 2003:

The core strategy is a fundamental transformation for our supply chain, it is fundamental change for our business and it is fundamental transformation for what people are doing across Europe. We are really moving forward to do something very simple; all the supply chain has to do is provide excellent service at an unbeatable cost and deliver it through having highly motivated great colleagues, particularly at a time when the tough environment is making it difficult to get people to come and work for you.

One of the core elements of the strategy was to get rid of most of the physical networks, and start again and build sheds that were fit for purpose. We needed to change all the systems; our functionality was way behind the times, and we were not giving colleagues the right tools for the job. We needed to lift their heads and let them see a new and more modern way of doing it, to change fundamentally the way we operate. It is a huge task. No one in Europe is doing anything of this size of this complexity and most importantly at this pace.

It is end to end. It is substantial. It is a radical new programme. We are implementing differently to the way anyone else has tried to go about it. Clearly, it is critical.

Despite the fundamental and critical nature of the re-engineering process, the reality on implementation was not pretty. The business simply could not get the right products to the stores in sufficient volume and on time. Empty shelves in its stores were testimony to how great a failure the new system was. Poor stock availability is unacceptable. Marketing becomes impotent when the products involved are buried away in some depot instead of being at the end of the supply chain. Some Sainsbury's outlets struggled to even provide an acceptable percentage of staple products. Dissatisfied customers understandably went elsewhere.

By October 2004, the problems had become acute. Sainsbury's had not made ground up on its rivals generally. Another new CEO (Justin King) had

been brought in. From the summer of 2004, customers had been unable to find many products on the shelves of its stores. King stated bluntly, 'Sainsbury blew millions on IT systems and automated depots that were too complex and couldn't deliver the goods to the shop'. Product availability in 2004 was worse than before the change process started. Additionally, exceptional costs of £550 million were incurred, including writing off £140 million of useless IT assets and £120 million of automated equipment for depots. There is an irony in the dissonance between the aim of 'excellent service at an unbeatable cost' and its associated cost-reduction supply chain claims and the reality of poor availability and huge financial write-downs, let alone the damage to brand reputation.

Lawrence Christensen (the ex-Supply Chain Director of Safeway) was brought in and mandated to sort out the problems. He opted to go back to basics and revert to manual processes for stock-level management. After problem identification, he began to sort out the automated warehouses, draw up an action plan to get the best out of what already existed, and improve communication between the distribution facilities and Witron and Siemens, the companies behind the automation equipment. Furthermore, about 3,000 new employees were hired to manually sort products where needed. At their lowest point, Hams Hall, Waltham Point, and Rye Park were turning away 50 per cent of supplier deliveries. In October 2004, the fulfilment factories were each operating at a capacity of only 800,000 cases a week (around 30 per cent of capacity) being picked and delivered and systems were breaking down regularly.

The Annual Report for 2006 noted the steps to put things right:

We've made big changes in the supply chain, reorganising processes to ensure we get the right products to the right stores at the right time. Getting the supply chain right has required decisive action. We transferred our operation at Charlton to a third party operator, closed our depots at Northfleet and Rotherham and reorganized our Basingstoke and St Albans depots into multi-purpose facilities, providing chilled, ambient and fresh products to stores. We have used our Buntingford facility to provide additional capacity at Christmas for the past two years, but will now keep it open to help us keep pace with sales growth. We worked successfully to win support for our actions from colleagues and unions.

Our Waltham Point and Hams Hall depots are now processing an average of two million cases a week, significantly up on 2004/05.

In January 2006 Roger Burnley joined us as Supply Chain Director and Lawrence Christensen moved into a part-time consulting role. Roger will now concentrate on consolidating the numerous changes already made. Replenishment orders are being delivered faster and in a store-friendly way, with products already sorted according to the aisles in which they are found in store, and we're working with suppliers to help us improve availability even further and reduce costs.

The 2008 Annual Report commented on the success of this back to basics programme:

Within the distribution network there has been significant improvement to depot productivity and store deliveries. These have been driven by new processes, network re-organisation, a new transport management system and the introduction of new facilities such as a new 530,000 sq ft depot at Northampton, built under carbon-negative conditions, which opened in November 2007. In April 2008 we announced the appointment of Roger Burnley, previously supply chain director, into the new role of retail and logistics director on our operating board. This reflected in part that the task had changed from fixing the basics to ongoing operational improvements by consolidating the responsibility for both store and depot operations. A 355,000 sq ft ambient facility was acquired in Staffordshire in March 2008 and a 550,000 sq ft centre in North Yorkshire, to be operated by logistics specialist Wincanton, will be used to consolidate the convenience store supply chain operation currently based in two centres at Maltby and Skelton. These will close later this year. The new depot will also provide relief for the supermarket estate this Christmas and when fully operational will employ around 500 colleagues. At Waltham Point, some of the automated equipment has been removed and similar refurbishment is planned at Hams Hall later this year.

What is noticeable from this saga is the sheer effort involved to unravel a very complicated initial re-engineering. Once the problem had been recognized, basic business solutions were imposed to get back on track. After this it was realized that substantial investment and system alteration still remained. The recent changes have begun to produce a modern supply chain for the business. But, Sainsbury cannot neglect to adapt further in the future if they want to avoid a similar story of decline and then chaos.

SOURCES: BBC, 2004; White, 2003; Zentes *et al*, 2007; Sainsbury Annual Reports (various).

Supply chain challenges

Throughout the 2000s much management attention was devoted to FGP, including global sourcing, on-shelf availability and the implementation of technologies such as radio frequency identification (RFID). To some extent, however, these issues are operational rather than strategic in nature and there are clearly some major strategic concerns (see Sparks, 2010). Among these challenges are key ones relating to e-commerce (including mobile and other forms) and environmental sustainability.

E-commerce

While members of the supply chain have sought ways to foster collaboration, the rise of e-commerce has posed a set of challenges for retailers (Burt and Sparks, 2003). The rise and subsequent fall of many dot.com companies in 1998–2002 led to a high degree of speculation as to the re-configuration of the business to consumer (B2C) channel. Ultimately, e-fulfilment, especially the ‘last mile’ problem of delivering goods to the final customer, holds the key to success in this channel. The business to business (B2B) channel, however, has more to offer members of the supply chain because of the number and complexity of transactions and the greater adoption of internet technology by businesses compared with consumers. There have been numerous B2B exchange marketplaces created since the late 1990s with most of these exchanges being created in highly concentrated global markets sectors with a ‘streamlined’ number of buyers and sellers, for example in the automobile, chemical and steel industries. The more proactive retailers developed B2B internet exchanges as an extension of the EDI platforms created a decade earlier. This has enabled companies such as Tesco, Sainsbury’s and Wal-Mart to establish their own private exchanges with suppliers to share data on sales, product forecasting, promotion tracking and production planning. There are major benefits to be derived from replacing EDI efforts into a smaller number of B2B platforms. For example, it is easier to standardize processes for communication, reduce development costs and give members access to a larger customer base. Internal and external systems have thus been developed.

In the B2C channel, the rise and fall of internet retailers around 2000–02 brought a touch of realism to the evolving market potential of online shopping. In Europe, grocery retailers are powerful ‘bricks and mortar’ companies and the approach to internet retailing has until recently been reactive rather than proactive. Most internet operations have been small and few pure players have entered the market to challenge the conventional supermarket chains. Tesco is one of the few success stories in e-grocery, having adopted what was initially perceived as an unconventional model (see Box 1.3 – and in more detail in Chapter 7).

Why have many ‘pure players’ failed in this channel? Laseter *et al* (2000) identify four key challenges:

- 1 limited online potential;
- 2 high cost of delivery;
- 3 selection-variety trade-offs; and
- 4 existing entrenched competition.

Ring and Tigert (2001) came to similar conclusions when comparing the internet offering with the conventional 'bricks and mortar' experience. They looked at what consumers would trade away from a store in terms of the place, product, service and value for money by shopping online. They also detailed the 'killer costs' of the pure play internet grocers, notably the picking and delivery costs. The gist of the argument presented by these critics is that the standard pure-play internet model is flawed, and the spectacular demise of Webvan rather proved the point at that time.

The two main fulfilment models are the store based and dedicated order picking model. The former model makes use of existing distribution assets as products pass through DCs to stores where orders are assembled for delivery to online customers. The advantages of the store-picking model are the low initial investment required and the speed of rolling out the service to a wide geographical market. Customers also receive the same products online as available in stores. The problem here was that initially 'out of stocks' (OOS) and substitutions of products were more prevalent as online shoppers competed with in-store counterparts for products. This highlighted the availability issue prevalent in the early 2000s.

Box 1.3 Tesco.com: delivering home shopping

Tesco.com has become the world's largest internet grocery system in a very short time. Unlike many of its competitors, it initially opted for an in-store picking and home delivery operation, rather than starting with a dedicated DC system. This choice came about for three reasons:

- warehouse-based picking and delivery was not believed to be economic due to low penetration levels and drive times for vehicles being high;
- customers confirmed that they did not want a reduced offer online as this destroyed the point of shopping at Tesco for them; and
- outside of London, the penetration rates possible did not make a warehouse a valid option, even if other costs (eg picking) were solved.

This allowed a very rapid roll-out to effectively cover the United Kingdom through the network of stores. Each store involved has dedicated local

delivery vehicles. As the system bedded in, customer orders threw up some surprises:

- Fresh food was a big seller online, whereas people had initially expected big, bulky replenishment items to be the most popular.
- People planned their online order better than their in-store trip (aided by the Clubcard and internet item recall availability), so a higher proportion of spend is made with Tesco.
- The non-food item offer can be more extensive online than in-store so sales in this area was expanded.
- Knowledge was gained from the online shopping process of what items customers wanted to buy, but were not actually in stock. This helps enhance availability in the supply system.

By 2006 demand in the south east of England had reached the break-even point (see Figure 1.6) to enable Tesco to build its first dot.com only store in Croydon. Since then a further six dot com facilities will have been opened by 2014. Each of these so-called 'dark stores' operates 24 hours a day, employing around 700 staff, and due to investment in technology and changed working practices, are more productive than in-store picking. Already 80 per cent of online orders for London are picked from these sites.

Not only has Tesco dominated the UK grocery online market with around 40 per cent market share, it has developed an online grocery business in eight out of the 11 international markets that it operates within. Multi-channel retailing is at the heart of Tesco's future strategy for the business, building upon strong growth since 2010. For example, total online group sales in 2013 exceeded £3 billion for the first time with £2.3 billion from UK grocery sales, £281 million from international online sales and the remainder from Tesco Direct in the United Kingdom. Around two-thirds of Tesco Direct orders are collected in-store: indeed 'Click and Collect' is a main element of Tesco's online strategy for both grocery and non-food products and click and collect modules for grocery retailing are now a common sight on Tesco car parks.

SOURCE: adapted from Jones (2001); Tesco Annual Reports (various). See also Chapter 7.

The dedicated order picking model utilizes e-fulfilment centres to pick and deliver orders to customers. The advantages of this system is that it is dedicated purely to e-commerce customers so OOS should be low and delivery frequencies should be higher. These picking centres, however, have less of a product range and they need to be working at capacity to justify investment

costs. In non-food there are some highly successful operators of this model (eg asos.com).

Ultimately the picking centre model may well be the long-term solution to online grocery fulfilment for some areas. The problem is that the economics of order fulfilment and delivery are so poor in the short run that most companies have abandoned this approach or gone bankrupt, for example Webvan (see Figure 1.5). In the United Kingdom in the early 2000s, Asda closed two picking centres in London and Sainsbury's developed a hybrid model. So why has the so-called least efficient fulfilment model proven successful? The answer is simple: retailers need to create market demand before investing in costly infrastructure. As illustrated in Figure 1.6, there is

FIGURE 1.5 E-fulfilment models

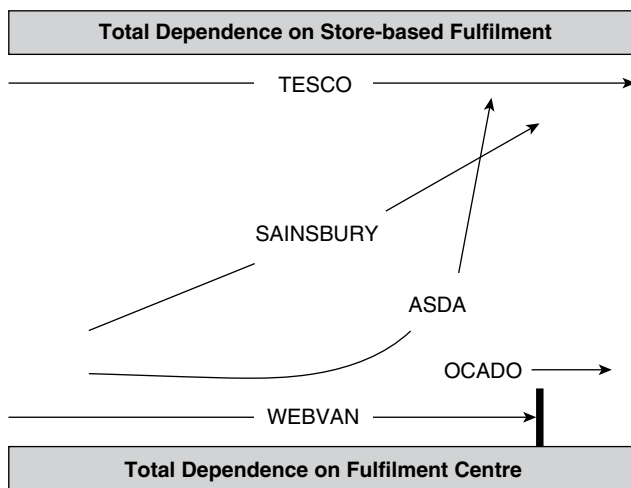
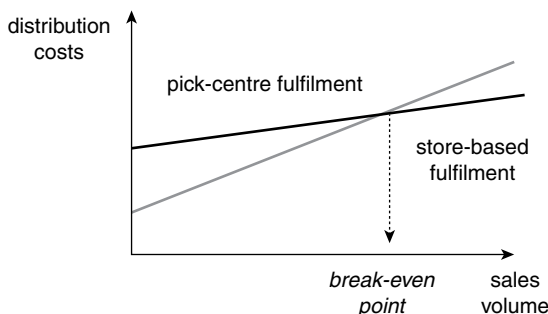


FIGURE 1.6 Break-even analysis of switch from store-based to pick-centre fulfilment



a break-even point where sales volumes justify investment in picking centres. Tesco reached this point in 2006 when it opened its first specialist dot com ('dark store') facility in Croydon and by 2013 it had opened three other sites (with others planned) all supporting the densely populated south-east of England where volume and order density was high. By contrast, Wal-Mart is at the very early stage of online innovation partly because of the different nature of the US market compared to the UK market; indeed, Asda, which lags far behind Tesco's operation in the United Kingdom, offers Wal-Mart its best business practice on e-commerce. Nevertheless, the world's largest retailer has announced plans in 2013 to make up lost ground. It intends to use its 4,000-plus stores in the United States as order fulfilment centres and is trialling a locker collection in 12 stores to offer a 'click and collect' option. More radically it is considering the use of store shoppers as a delivery mechanism whereby shoppers would deliver to web customers in return for discounts on their purchases (*Retail Week*, 12 April 2013).

One of the large changes in recent years has been the expansion of 'reserve and collect' and 'click and collect' type operations. It had been thought that internet shopping would be based around home delivery, but consumers have shown that they value as well the ability to decide where and when they receive the product. In reserve and collect type systems consumers seem to be using the internet to check local inventory before going to the store. In click and collect operations they are opting to have the order assembled at store and then collecting it at a time of their choosing and convenience. For retailers such developments remove some of the issues of organizing home delivery, but emphasize the importance of having accurate and real-time stock files and inventories as well as changing work practices. Similarly, the strong development of mobile and tablet computing and shopping has encouraged retailers to shorten their advertised delivery periods (eg Next Directory) and in some urban areas to offer same-day or even two hour-delivery options. We are seeing a major transformation in how some consumers receive some products, and a move away from the case movement to stores to item level delivery to consumers in short timeframes. This poses real challenges for many retailers.

E-commerce is here to stay and B2B and B2C channels will increase in importance once established standards for data transfer across the supply chain are realized. Already, the information revolution has been the catalyst for improving supply chain efficiency and for fostering stronger relationships between supply chain partners. Private internet exchanges developed by leading retailers, such as Wal-Mart with their Retail Link network, have enabled them to respond quickly to consumer choice at store level. Indeed, much of the focus of this chapter has centred upon how competitive advantage can be achieved through companies cooperating and thus responding flexibly and quickly to market needs, hence the acronyms of JIT for lean supply chains and QR and ECR for agile supply chains.

Regardless of sector or industry, supply chain integration can only be achieved through greater collaboration and coordination of functions

across supply chains. This means partnerships, alliances and networks that are created within and between organizations. Traditional functions can no longer be viewed in isolation or 'silos' independent from the workings of other parts of their own and other businesses. Cross-functional teamwork and inter-organizational cooperation will therefore hold the key to future developments in supply chain management. RFID, for example, does not fully realize its potential unless the data are shared and used to solve problems and create visibility across the channel.

Sustainability

In terms of future challenges it is necessary to mention a second aspect of supply chains. One of the implicit reasons behind aspects of data communication in supply chains, and the use of these data in such systems as outlined above, is to reduce the demands for unnecessary product packaging and movement. It has long been recognized that cost performance and service can both be enhanced by appropriate movement of data and product. In essence this is a resource reduction strategy. More overtly, there has been increasing concern with the environmental impact of logistics and companies have become increasingly concerned to ensure that their activities are appropriate. Through better use of data to understand activities, aspects of supply can be minimized. In addition, supply chains can be enhanced to ensure that resources are reused or recycled in the system and that reverse channels of logistics can reclaim valuable resources from packaging and product. Much more needs to be done in this regard, but this issue will be one of the major challenges for the future.

It could be argued, for example, that many of the logistics efficiencies described above have been generated by operating systems that are insufficiently environmentally aware. Logistics can have a major adverse impact upon the environment. While improvements in vehicle design, engine efficiency, reusable handling systems and building standards have reduced the impacts, the distances products now have to travel have accentuated the problems. Environmental issues are thus a major issue of future concern. They are also an issue that has become more important due to macro changes in the environment and perceptions and views over impact. The rise of awareness of climate change, environmental impact and sustainability has been dramatic. Retailers and their supply chain partners have no choice but to respond as customers expect appropriate responses and the impacts of logistics are so visible. Retail logistics is thus set to be transformed as the full issues in this area become clear and understood.

It has to be recognized, however, that terminology in this area has been the subject of some confusion. A reasonable starting point is:

Reverse logistics is a process whereby companies can become more environmentally efficient through the recycling, re-use and reducing the amount of materials used. Viewed narrowly, it can be thought of as the reverse distribution of materials among channel members. A more holistic view of

reverse logistics includes the reduction of materials in the forward system in such a way that fewer materials flow back, reuse of materials is possible, and recycling is facilitated.

(Carter and Ellram, 1998, p 82)

In a retail context it is relatively straightforward to think of elements that fit these definitions. Many retailers operate a recycling policy for consumers to use and for aspects of their stores' waste. In some countries there may be legal or fiscal encouragement. Some recycling may be internalized in the company. Other material is sold on for external recycling purposes. The balance among these will swing towards resource reduction.

In the grocery industry, the use of plastic trays and boxes to carry and distribute fresh product has become standard (Gustafsson *et al*, 2006). Many DCs contain specialist centres for cleaning and re-using such equipment. This is an example of a reverse logistics system in that a channel has had to be created in order to move containers back down the chain. In reality, the vehicles that deliver to store often back-haul containers to DCs or to manufacturers. Other measures to reduce unnecessary vehicle miles have been implemented such as the use of rail rather than road to tranship product over longer distances, for example the Tesco train that brings goods from the English Midlands to Scotland.

Although it can be argued that UK grocery retailers have embraced the sustainable distribution agenda in the 2000s through these initiatives, ECR UK initiated a Product and Packaging Waste Working Group in 2010 to reduce waste to landfill primarily because of the costs of disposal (£80 per tonne costing the industry £5 billion per year). The working group initially set a waste reduction target of 75,000 tonnes by 2012 and having bettered this target by 11,000 tonnes have an extended aim of preventing 200,000 tonnes of waste from being created by December 2014. There are 34 major UK food and grocery companies who have committed to this target, representing engagement all along the supply chain to prevent waste between the factory and store. The IGD has produced a *Supply Chain, Waste Prevention Guide* to illustrate how waste can be reduced and profits enhanced. Numerous case studies have been published to highlight how waste reduction practices can also enhance supply chain efficiency. For example, Asda has re-engineered its fresh food supply chain to reduce time from suppliers through its distribution network, thereby improving availability later in the day and reducing product wastage (see www.IGD.com).

In non-food a good example of some of these issues in practice is afforded by asos.com, the online retailer of fast fashion. ASOS pride themselves on their ability to meet the demands of consumers very quickly. However, like many fashion retailers online they suffer from a high level of returns. Much effort therefore is placed on speeding up the return flows of products and getting them back in the inventory and available for sale to consumers. Both delivery and return have had to speed up to meet demands, but if this is not managed correctly then there will be huge costs and wastage in the system.

Conclusions

This consideration of the changes and challenges in retail logistics allows us to summarize the key issues in retail logistics and supply chains. There are a number of changes in modern retail supply chains that are direct responses to the changing demands of consumers.

Pace

If nothing else, the modern consumer is more demanding and less patient than before. As a consequence, retailers, particularly in fashion goods, cannot afford to take a long time to develop, manufacture and then deliver the product. Speed or pace is vital. The concept of 'fast fashion', as developed by Zara and Hennes & Mauritz among others, shortens the product lifecycle in clothing from months and years to weeks and months. Development and manufacture time is slashed and demand response time is also shortened dramatically. The pace of the supply chain has also increased. This is not to say that speed in supply chains is the key priority: supply chains need to be fast on occasions, but more importantly, they have to accurately and reliably deliver the right products at the right time. This issue of pace/speed has become highlighted by the recent m-commerce developments.

Span

Retailers are also now far more global in their outlook. As a consequence, they have to manage supply chains that span the globe. They are searching for low-cost production, but link this to an ability to distribute the product effectively from far-spread points of production to multiple locations for purchase and then consumption. There is little point in moving production points to faraway but low-cost sites if the cost and time of distribution and supply outweigh these production benefits. Retailers now talk about global supply rather than global production and are increasingly aware of the need to manage this business globally. In some cases this does mean repatriating some production to meet the consumer 'speed' challenge.

Availability

To meet the needs of ever more demanding consumers, retailers are increasingly more concerned about availability of products in store and online. Whereas increasing pace in supply chains and broadening spans of production would seem to be contradictory pressures on availability, both in fact can assist in enhancing broad supply chain availability. In part, this arises from the need to control supply chains more directly. But general availability is not what consumers require; consumers need specific 'on-shelf' (whether physical or virtual shops) availability in front of them as they shop. Much attention has therefore been paid by retailers to ensure that the products are moved onto

shelves more efficiently, rather than ‘resting’ in stock rooms. Any development that speeds up and simplifies this process (the so-called last 50 metres) is thus of importance. Concepts such as shelf-ready merchandise, retail-ready packaging or one-touch systems have found ready markets. Products have to be designed not only with their customer profile in mind, but with their supply and handling requirements identified as well. Badly designed products and packaging from a supply chain viewpoint add cost and time to handling and reduce availability.

Information

Perhaps the critical element in retail supply chain change has been the ability to collect, disseminate and use data throughout the supply chain and the supply chain partners. Data collection on product levels and movements has allowed visibility in the supply chain (both vertically and horizontally) and has enabled stronger control of logistics and supply chain operations. By focusing on data and information, supply chain managers can increase the pace and accuracy of supply chains, allow a broader scope or span and focus on ensuring availability improvements. Data have become the lifeblood of retail supply chains. There can be difficulties in managing data on occasions and there is potential data overload if appropriate systems are not put in place. Similarly, technology systems’ introduction does not always go smoothly and can be highly disruptive to existing business practices. Nevertheless, the ability to collect, store and use greater amounts of data at more detailed levels and to transform these data into management information have undoubtedly enhanced retail supply systems, reducing stock levels and aiding appropriate and rapid response to consumer demand.

These changes to retail supply chains raise a number of implications for the management of retail supply chains. To a considerable extent they have had a transformative effect on how retailers (and their supply chain partners) view the management of retail supply chains. Here, we identify three implications of these changes.

Supply chains compete

In the traditional model of retailing, it was often believed that competition was among retailers alone, that is, at the horizontal level only. It is now increasingly realized that retailers are at the fulcrum of supply chains, between production and consumption. As such, the retail store and website is the recipient of both changing demand and supply. To the consumer, if a product is not available, then it is the retailer’s fault, irrespective of where the true problem lies. As such, retailers compete not only horizontally among themselves, but vertically as well in terms of the efficiency and effectiveness of their supply systems. For a retailer, the implication of this is that they need to extend their reach into the supply chain so as to make it as efficient and effective as possible. Increasingly retailers need to extend this reach into delivering products into the hands of consumers – the store is no longer the only model.

Relationships matter

Given this need to extend reach into the supply chains, retailers are confronted with a major problem. The pace and scope of modern supply chains means that, in most cases, it is not possible for retailers to actively undertake all the supply chain tasks themselves. Rather than vertical integration, vertical coordination may be the aim, but based perhaps on the integration of aspects of information systems. By properly managing supply chains, effectiveness and efficiency may be enhanced. However, this management task can be very large. To combat this, retailers have utilized logistics services providers to carry out many logistics activities, including a considerable degree of supply chain management activities such as coordination, management and control. Additionally, in recognition of the pressures to make supply chains effective and efficient, there has been a tendency to simplify their structures. Thus, the number of direct partners and activities in many cases has been reduced considerably, such that the coordination activities are between a more limited number of supply chain partners, with a consequence potential for the deepening of relationships and activities. As the recent horsemeat scandal in Europe shows, there remains much work to be done in traceability and security in some supply chains.

Information, not product movement

The management task in supply chains has been aided by these processes of simplification and coordination. It has also been assisted by the considerable developments in data capture, storage and dissemination. Supply chains have become increasingly data-rich with these data often shared among the components of the supply chain partners. Data visibility means that to a large extent, data movement has replaced product movement in supply chains. As supply chains have become coordinated and focused on getting closer to 'just-in-time' rather than operating as 'just-in-case', so the need for accurate management information increases. There also remains much to be done in this regard, but the ability of retailers to 'see' the products at various stages in the supply chain has assisted their drives towards the development of effective and efficient supply chains. It does not matter if the supply-chain orientation is towards 'lean' or 'agile' approaches, as all retailers and suppliers should be interested in having supply chains that simplify base flows and can respond rapidly to changing consumer demands when necessary.

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Relationships in the supply chain

02

John Fernie

Introduction

Relationship marketing (RM), Customer Relationship Marketing (CRM), e-CRM for online businesses and Collaborative Planning, Forecasting and Replenishment (CPFR) are only some of the acronyms to appear in the academic literature in the last 10 to 15 years. This represents a major paradigm shift in marketing and logistics away from a traditional transactional view of exchange between buyers and sellers to a more proactive, collaborative relationship approach. The purpose of this chapter is to discuss the conceptual framework of supply chain relationships and their applications to retailing through quick response (QR) and efficient consumer response (ECR) initiatives. Finally, the role of logistical service providers in supply chain relationships will be reviewed.

Changing buyer–seller relationships

The origins of the relationship approach to understanding buyer–seller interaction at different parts of the supply chain goes back several decades when the conventional marketing mix paradigm began to be challenged. The growth of the service sector, the move from mass marketing to micro marketing to mass customization, with the associated database infrastructure, allowed companies to target customers more effectively. While consumer marketing embraced a relationship approach to improve customer retention, these trends were particularly prominent in industrial markets where the Industrial Marketing and Purchasing Group initiated much of the business-to-business research in this area.

In parallel with these developments was a growing literature in logistics and supply chain management embodying similar paradigms and constructs.

The fourth P of the marketing mix, Place, was traditionally centred on the wholesale and retail trade and how suppliers would channel their products to market. By the 1980s two key factors would begin to elevate logistics to greater prominence in the literature – the rise in power of the multiple retailers thereby changing power relationships and the need to eliminate inventory and non-value added activities in getting products to market. Thus, to compete with Japanese manufacturing, European and US companies embraced just in time (JIT) techniques, reduced their supply base and worked closer with the remaining suppliers. So throughout the 1990s debates emerged on the lean compared with the agile supply chain, the latter more relevant to the fast moving consumer goods (FMCG) market.

Interestingly, with a few exceptions such as Martin Christopher, the academic literature on relationships tends to be published in discrete camps as evidenced by readers on marketing (Hart, 2003) and logistics (Waters, 2010) which exhibit similar constructs when discussing relationships but very rarely cross-reference between ‘marketing’ and ‘supply chain’ literatures. Nevertheless, key themes are common – power and dependence, trust and commitment, cooperation and co-opetition, which will be discussed in turn.

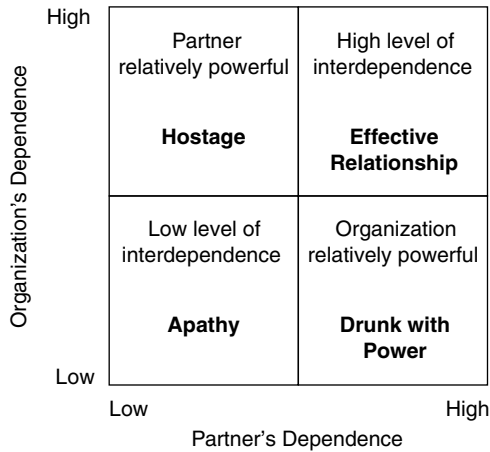
Power and dependence

‘Power in the supply chain can be defined operationally as the ability of one entity in the chain to control the decision of another entity’ (Daparian and Hogarth-Scott, 2003, p 259). It is generally agreed that the power base has shifted over time from supplier to retailer. When French and Raven (1959) produced their seminal work, the suppliers controlled the supply chain. The five power bases which they identified – reward power, coercive power, referent power, legitimate power and expert power would lead to dependency of the retailer on the supplier, especially with regard to expert power in that the supplier had the marketing/logistics expertise in the channel. Clearly this has changed in half a century in that retailers can delist (coercive), reward, joint promote (referent) and dictate terms (legitimate) to suppliers because of their dominant market position (expert power).

The nature of such relationships between manufacturers and retailers was discussed by Kumar (1996) in a study of 400 relationships. He categorized them into different levels of dependence (Figure 2.1). The ‘win-win’ quadrant is the top right category where there is a high level of interdependence between parties. The ‘hostage’ and ‘drunk with power’ categories could lead to a breakdown in the relationship.

Trust and commitment

According to Kumar (1996) trust is the antithesis of power and it is trust that leads to cooperation. However, trust can easily be heralded as ‘the glue that holds a relationship’ (O’Malley, 2003, p 130) but it is difficult to

FIGURE 2.1 Effects of interdependence

SOURCE: Kumar, 1996

measure because this involves social networks that are inherently fluid in a retail buying context. At an organizational level trust, and therefore commitment, can be related to the relationship lifecycle. Many UK private label suppliers have grown with the retailers which they supplied, especially in the area of chilled fresh food where the category was developed by the retailer in partnership with these companies. This does not guarantee stability, as evidenced by Marks & Spencer's breakdown in relationship with some UK clothing suppliers when it decided to source products offshore and thereby sever links that had been fostered for generations. Much of the discussion on the nature of competition in the UK grocery sector has focused upon the possible abuse of power by retailers and their suppliers and the need for a strict code of practice. The Competition Commission reporting in 2008 created a Groceries Supply Code of Practice for retailers with over £1 million turnover to monitor their dealings with suppliers through a compliance officer and an ombudsman to arbitrate in disputes.

Cooperation and co-opetition

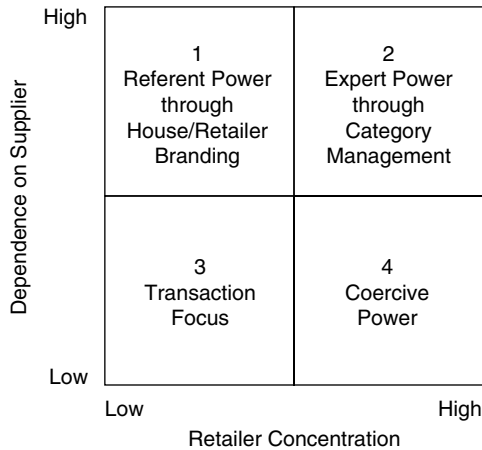
Much of the literature from ECR conferences and trade bodies imply greater collaboration between supply chain partners. This is discussed in more depth in the next section. In the academic literature, most attention has been focused upon collaborative advantage rather than competitive advantage (Christopher and Peck, 2003) and co-opetition (Brandenburger and Nalebüff, 1996) rather than competition. The thrust of this argument is that in sectors such as the FMCG industry where demand is stable, it is more appropriate for companies to 'grow the cake' in specific categories by boosting demand and compete on conventional marketing criteria. Similarly,

companies have reviewed their logistics operations and are now willing to collaborate with competitors on 'invisible', shared resources but not on promotion or 'visible' marketing efforts. This mirrors the well-established approach by Japanese manufacturing companies which cooperate on R&D but compete on the branded consumer goods in the marketplace.

The creation of value-added partnerships within industrial sectors is based on the tenets of resource-based theory, transaction cost analysis and network theory. In essence, the key decisions that have to be taken by companies within the supply chain relate to their core competencies, the allocation of resources and the network of organizations with which they interact. The best examples of such a division of labour is in the clothing 'fast fashion' sector, which is discussed at length elsewhere in the book. Benetton is the classical example of the network organization with its international poles throughout the world. Here Benetton keeps the capital-intensive parts of the operation 'in house', contracting out to SMEs the labour-intensive phase of production (tailoring, knitting, ironing). Likewise, Zara has developed its production pole at La Coruña with its integrated network of SMEs in Galicia and northern Portugal.

In other parts of the retail sector, the rosy picture of collaboration and cooperation is less evident from published empirical research. An earlier edition of this volume cited work by Hogarth-Scott and Parkinson (1993) and Ogbonna and Wilkinson (1996) in the food sector of a more adversarial approach than the 'partnership' dialogue promulgated at the time. In the basic clothing sector similar trends were evident (Fernie, 1998) and the downward pressure in prices with the intense competition in the UK clothing market has done little to redress the emphasis on tough price negotiations. This has continued to be the case, especially in the fast fashion sector with its short lead times and low prices leading to question marks over the ethics of offshore sourcing by some companies. Corporate social responsibility and international sourcing in the textile sector will be discussed in more depth in Chapter 4.

The Competition Commission and Office of Fair Trading (OFT) reports throughout the 2000s investigating the nature of competition in the UK supermarket sector were generally supportive of the status quo except for assessing the need for greater local competition and the need for a code of practice (discussed earlier) to eliminate the worst excesses of retailer power on suppliers. Also anecdotal evidence would appear to suggest that prices were being driven down to unacceptable levels plus other 'contributions' for slotting allowances and other discounts for volume purchases. In their study of buyer-seller relationships in the UK and Australian markets, Dapiran and Hogarth-Scott (2003) challenge many of the conventional views on cooperation, trust and power. They claim that much of the literature argues that power is a negative construct and is invariably viewed as a distinctive independent construct divorced from the construct of cooperation. From their research, they would maintain that cooperation occurs as a result of compliant behaviour brought about by the application of power.

FIGURE 2.2 Power strategies of retailers

SOURCE: Dapiran and Hogarth-Scott, 2003

Using the results from their survey, Dapiran and Hogarth-Scott (2003) discuss dependence and power in relation to retail concentration and supplier dependency. Therefore, where retail concentration is high and there is low retailer dependence on the supplier, retailers will be more likely to use coercive power. Where concentration levels are high but dependence on suppliers is also high, retailers are more likely to use expert power, probably through the use of category management. The use of such expert power leads to cooperative behaviour which in turns leads to greater trust within the relationship. This model is illustrated in Figure 2.2, which shows that the use of coercive/reward power can lead to capitulation in the relationship even if trust is broken within the context of category management and the referent/expert power in the right hand quadrant disintegrates into coercive power.

Martin Hingley's (2005) work on the fresh food supply chain in the United Kingdom concurs with the views of Dapiran and Hogarth-Scott (2003) in that 'the notion devised in mainstream RM (relationship marketing) literature that power is a negative and divisive influence that precludes relationshiping, is clearly flawed' (p 562). His research shows that there is an imbalance in power in such relationships but this does not exclude successful partnerships taking place. In all relationships friction and attempts to gain the upper hand will exist and will change over time.

Research by Fearné (2005) and his colleagues at Kent Business School offer further evidence that relationships are complex in the fresh food supply chain. Their research was carried out in the wake of the initial implementation of the Code of Practice referred to earlier and sought to measure fairness in exchange relationships. Their findings show considerable variation in behaviours across the sector from supermarket chains with EDLP

(everyday low price) strategies to those embracing niche, regional strategies. Notably, the EDLP company exposed the myth that low price equates with squeezing suppliers' margins. Category leadership was another feature of successful relationships in fresh food supply chains. In the sample here, a company developed relationships with a category champion which took responsibility for sourcing and distributing in the meat and dairy sectors. By coordinating the supply base to the retailer, greater efficiency in logistics operations can be achieved. This approach of using an intermediary is a feature of the fresh food supply chain.

Quick Response (QR)

The term QR was coined in the United States in 1985 (Ferne, 1994; Hines, 2001) when Kurt Salmon Associates (KSA) recognized deficiencies in the fashion supply chain. According to KSA, only 11 weeks out of the 66-week lead-time in the pipeline are spent on the actual processes (value-adding time/horizontal time), and the rest (non-value-adding time/vertical time) are wasted in the form of WIP and finished inventories at various stages of the complex system (KSA, 1997; Christopher, 1997, 1998; Christopher and Peck, 1998). The resultant losses arising from this was estimated at 25 billion dollars, due to stocking too large an inventory of unwanted items and too small of the fast-movers.

In response to this situation, the US textiles, apparel and retail industries formed VICS (Voluntary Interindustry Commerce Standards Association) in 1986 as their joint effort to streamline the supply chain and make a significant contribution in getting the in-vogue style at the right time in the right place (Ferne, 1994, 1998) with increased variety (Giunipero *et al*, 2001; Lowson, 1998; Lowson *et al*, 1999) and inexpensive prices. This is done by applying an industry standard in information technologies (eg barcode, Electronic Data Interchange (EDI), shipping container marking, roll ID etc) and contractual procedures (Lowson *et al*, 1999; Ko *et al*, 2000; Giunipero *et al*, 2001) among the supply chain members. Not only is QR an IT-driven systematic approach (Forza and Vinelli, 1996, 1997, 2000; Hunter, 1990; Riddle *et al*, 1999) to achieve supply chain efficiency from raw materials to retail stores, but also is it a win-win partnership in which each member of the supply chain shares the risks and the benefits of the partnership on an equal basis to realize the philosophy of 'the whole is stronger than the parts'.

QR, in principle, requires the traditional buyer-supplier relationship that is too often motivated by opportunism, to transform into a more collaborative partnership. In this QR partnership, the objectives of the vendor are to develop the customer's business. The benefit to the vendor is the likelihood that they will be treated as a preferred supplier. At the same time, the costs of serving that customer should be lower as a result of a greater sharing of information, integrated logistics systems and so on (Christopher and

Peck, 1997; Christopher and Juttner, 2000). Thus, partnership among the supply chain members is a prerequisite of QR programmes.

QR's ultimate goal, nonetheless, is to give customers the savings that are gained through the initiative (Giunipero *et al*, 2001). The last, and perhaps one of the most important tenets of the original proposition of the QR concept is that QR is a survival strategy of the domestic manufacturing sector in the advanced economies against competition from low-cost imports (Finnie, 1992; Ministry of International Trade and Industry (MITI), 1993, 1995, 1999; Ministry of Economy, Trade and Industry (METI), 2002). In the case of the United States, the QR initiative was expected to make a considerable contribution to the 'Pride with the USA' campaign, which promoted the excellence of US-made products to American consumers, who had already been familiar with inexpensive imported casual clothing.

With the basic fashion category, relatively steady demand is a feature of the market, therefore the US-born QR concept places much focus on the relationship between retailers and the apparel manufacturers. The eventual benefits on both parties are detailed in Table 2.1. Giunipero *et al* (2001) summarizes the hierarchical process of QR adaptation as an integral part of QR as business process re-engineering (Table 2.2). This model, most appropriate for the apparel-retail linkage in basic clothing, has become a role model for QR programmes in other advanced economies. QR implementation, however, has been patchy as evidenced from studies undertaken in the last decade. Birtwistle *et al* (2003) in a study of QR implementation in UK clothing retailing noted the slow progress made towards external integration of the textile supply chain with most gains being made in stages 1 and 2 of the QR development model (Table 2.2). Even in the United States, the financial benefits of QR implementation are inconclusive. Brown

TABLE 2.1 Retailers' and suppliers' QR benefits

Retailers' QR benefits	Suppliers' QR benefits
Reduced costs	Reduced costs
Reduced inventories	Predictable production cycles
Faster merchandise flow	Frequency of orders
Customer satisfaction	Closer ties to retailers
Increased sales	Ability to monitor sales
Competitive advantage	Competitive advantage

SOURCE: Quick Response Services, 1995

TABLE 2.2 Technological and organizational QR development stages**STAGE 1 (Introduction of basic QR technologies)**

SKU Level Scanning
 JAN (Standard) Barcode
 Use of EDI
 Use of Standard EDI

STAGE 2 (Internal process reengineering via technological and organizational improvement)

Electronic Communication for Replenishment
 Use of Cross-Docking
 Small Amounts of Inventory in the System
 Small Lot Size Order Processing
 Automatic Replenishment Program
 JIT Delivery
 Shipping Container Marking
 Advanced Shipping Notice

STAGE 3 Realization of a collaborative supply chain and Win-Win relationship)

Real-time Sales Data Sharing
 Stock-out Data Sharing
 QR Team Meets with Partnerships
 Material Resource Planning

SOURCE: Giunipero *et al* (2001); KSA (1997)

and Buttross (2008) measured the financial performance of companies who had adopted QR compared to those who had not. They found that adopters did not achieve significantly better results on profitability, cost-efficiency or inventory levels than non-adopters and cited increased transport costs, carrying of more lines and corporate culture issues pertaining to collaboration as possible reasons for this outcome.

Having established many of the QR goals, VICS has implemented a CPFR programme, to synchronize market fluctuations and the supply chain in a more real-time fashion. Through establishing firm contracts among supply chain members and allowing them to share key information, CPFR makes the forecasting, production and replenishment cycle ever closer to the actual demands in the marketplace (VICS, 1998). While the American practices

have played a leading role in the QR and supply chain management (SCM) initiatives in the apparel industry, much of the success is in the basic fashion segment, where the manufacturing phase is normally the first to be transferred offshore. In this sense, the philosophy of QR as the survival strategy of fashion manufacturing in the industrial economies has not been realized.

It is interesting to note that QR in the United States was initially initiated to compete with imports, much of which came from Japan. Just over a decade later, harsh competition from offshore and a stagnant domestic market highlighted the costly structure and the lack of partnership in the Japanese fashion supply chain (MITI, 1993, 1999; METI, 2002). This led to the formation of QRPA (QR Promotion Association; now FISPA – Fashion Industry SCM Promotion Association) in 1994, as a joint endeavour of the Japanese T-A-R (Textile, Apparel and Retailing) industries to regain competitiveness of the overall domestic industry in order to effectively and efficiently serve ever-changing customers' needs.

While the US apparel industry mainly competes on a cost basis in the basic fashion segment, Japanese firms have forged their success on bridge fashion with flexible specialization (Piore and Sable, 1984) in a subcontracting network of process specialists in the industrial districts (Sanchi) led by the 'apparel firms' with design and marketing expertise. This is more akin to the Benetton model discussed earlier. Overall QR initiatives have had limited application within the domestic apparel industry with most success in the basic clothing sector supplying department stores.

Perry *et al* (2011) show how the Sri Lankan garment industry fosters strong relationships with US and EU retailers. The research findings indicate that Sri Lankan garment suppliers have developed strong relationships with US and EU retailers over a long period of time; trading relationships of 10–20 years were common. Although there has been pressure by customers to lower costs because of adverse market conditions in recent years, the larger full package suppliers have had been under less pressure to cut costs than contract manufacturers.

Efficient Consumer Response (ECR)

ECR emerged in the United States partly through the joint initiatives between Wal-Mart and Procter & Gamble and the increased competition in the traditional grocery industry in the early 1990s due to recession and competition from new retail formats. Once again, KSA was commissioned to analyse the supply chain of a US industrial sector. Similar trends were evident to their earlier work in the apparel sector; excessive inventories, long uncoordinated supply chains and an estimated potential savings of \$30 billion, 10.8 per cent of sales turnover (see Table 2.3).

ECR programmes commenced in Europe in 1993, a European Executive Board was created in 1994 and a series of projects and pilot studies were

TABLE 2.3 Comparison of scope and savings from supply chain studies

Supply chain study	Scope of study	Estimated savings
Kurt Salmon Associates (1993).	US dry grocery sector.	1 10.8% of sales of sales turnover (2.3% financial, 8.5% cost). 2 Total supply chain \$30bn, warehouse supplier dry sector \$10bn. 3 Supply chain cut by 41% from 104 days to 61 days.
Coca-Cola Supply Chain Collaboration (1994).	1 127 European companies. 2 Focused on cost reduction from end of manufacturers line. 3 Small proportion of category management.	1 2.3%–3.4% percentage points of sales turnover (60% to retailers, 40% to manufacturer).
ECR Europe (1996-ongoing).	1 15 value chain analysis studies (10 European manufacturers, 5 retailers). 2 15 product categories. 3 7 distribution channels.	1 5.7% percentage points of sales turnover (4.8% operating costs, 0.9% inventory cost). 2 Total supply chain saving of \$21bn. 3 UK savings £2bn

SOURCE: Fiddis, 1997

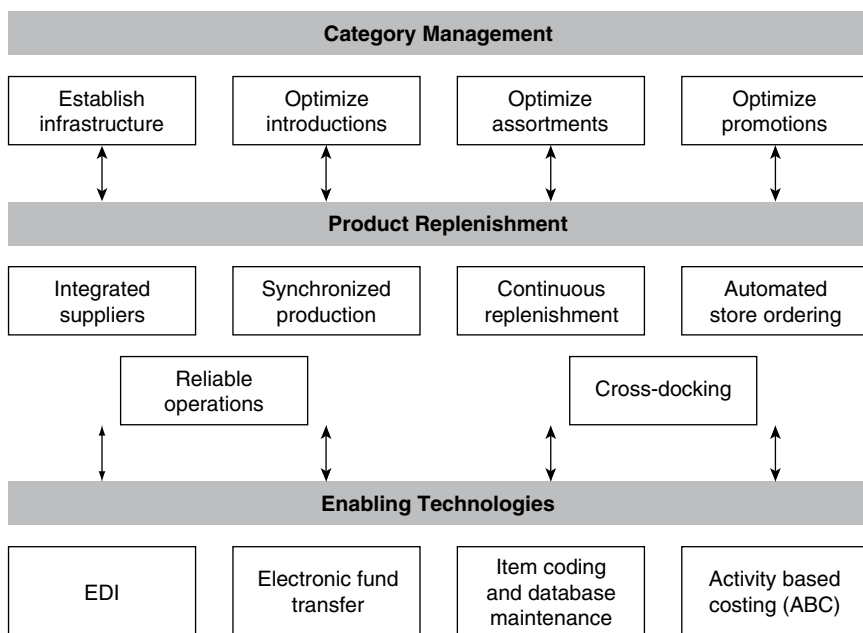
commissioned, for example, the Coopers & Lybrand survey of the grocery value chain estimated potential savings of 5.7 per cent of sales turnover (Coopers & Lybrand, 1996). Since then ECR has been adopted by around 50 countries in all of the continents of the world. The European ECR initiative defines ECR as a ‘global movement in the grocery industry focusing on the total supply chain – suppliers, manufacturers, wholesalers and retailers, working closer together to fulfil the changing demands of the grocery consumer better, faster and at least cost’ (Fiddis, 1997, p 40).

Despite the apparent emphasis on the consumer, much of the early studies focused mainly on the supply side of ECR. Initially reports sought

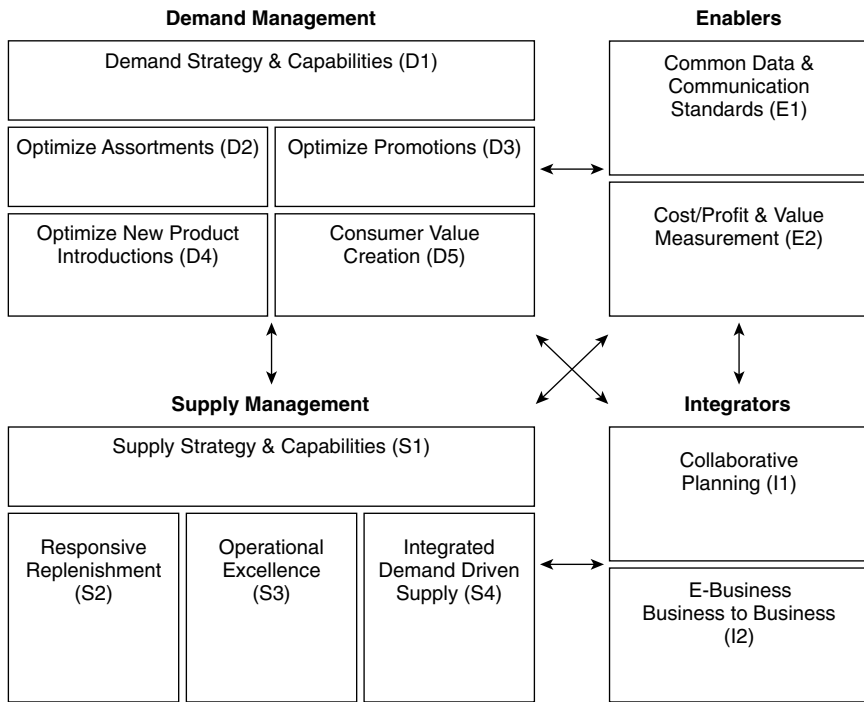
efficiencies in replenishment and the standardization of material handling equipment to eliminate unnecessary handling through the supply chain. The Coopers & Lybrand report in 1996 and subsequent re-prioritizing towards demand management, especially category management (see McGrath, 1997), has led to a more holistic view of the total supply chain being taken. Indeed, the greater cost savings attributed to the Coopers' study compared with that of Coca Cola can be attributed to a more narrow perspective of the value chain in the Coca Cola survey (Table 2.3).

The main focus areas addressed under ECR are category management, product replenishment and enabling technologies. As can be seen from Figure 2.3, these are broken down into 14 further areas where improvements can be made to enhance efficiency. After the exceptional success of ECR Europe's annual conferences in the late 1990s/early 2000s, a series of initiatives were promulgated which encouraged much greater international collaboration. ECR movements began to share best practice principles, most notably the bringing together of the different versions of the United States, Europe, Latin America and Asia scorecards to form a global scorecard. The scorecard was used to assess the performance of trading relationships. These relationships were measured under four categories – demand management, supply management, enablers and integrators (Figure 2.4). Comparing Figures 2.3 and 2.4 show how ECR has developed to accommodate changes

FIGURE 2.3 ECR improvement concepts



SOURCE: Coopers and Lybrand, 1996

FIGURE 2.4 ECR concepts

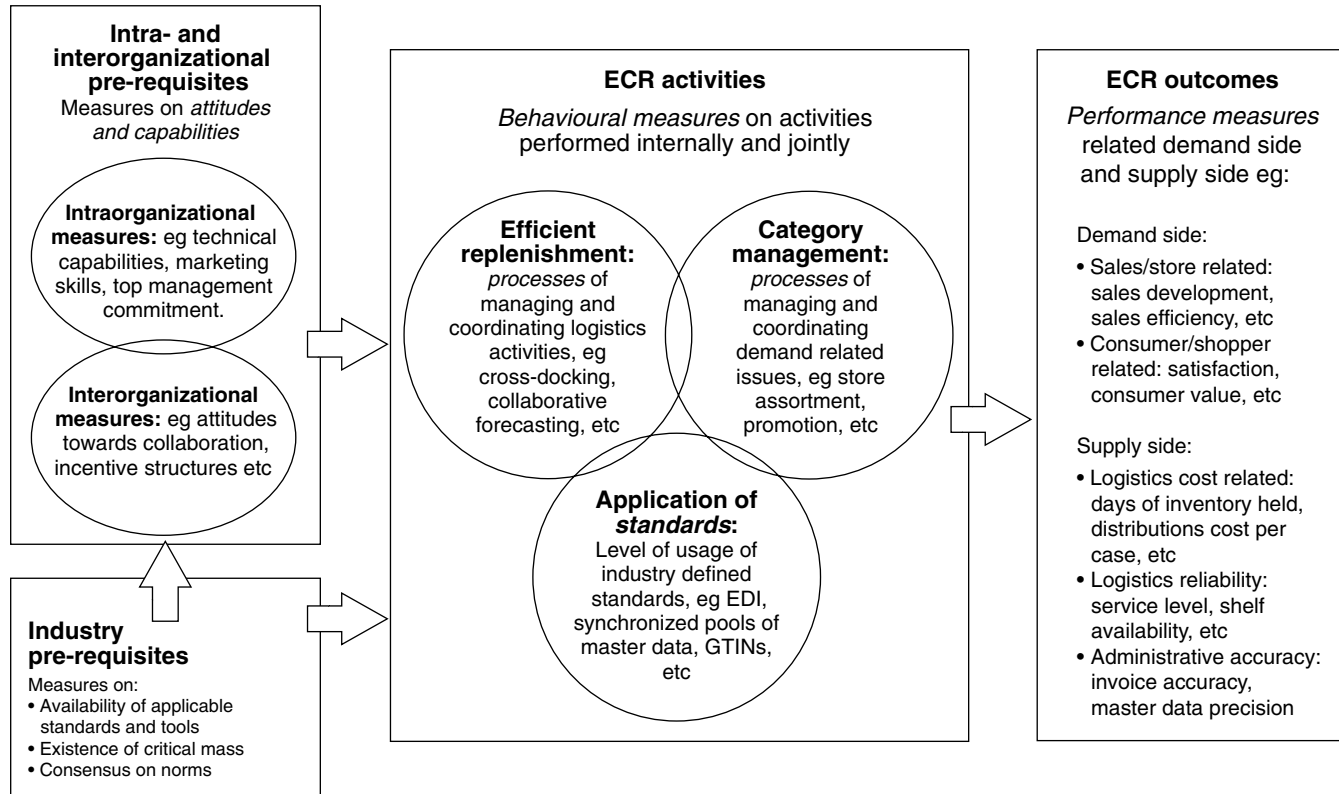
SOURCE: www.ecr-sa.co.za

in the market environment. It is not surprising that the Global Commerce Initiative (GCI) has been the instigator of the global scorecard in that one of its key objectives is to advocate the promulgation of common data and communications standards, including those pertaining to global web exchanges.

Astrup *et al* (2008) have proposed a model which integrates the prerequisites for success to ECR activities and outcomes (Figure 2.5). The prerequisites are either industry level or specific company-based. The industry level prerequisites include the availability of applicable standards and tools, the existence of critical mass within the sector and consensus on norms. Firm-specific prerequisites include attitudes towards the ECR concept, degree of collaboration necessary to share information and agreement on how costs/benefits are realized. Furthermore, the capability of companies to develop ECR initiatives is important, for example top management commitment to ECR and the technical capabilities to carry out such initiatives.

On performing ECR activities, outcomes and performance measures can be evaluated through demand and supply-related indicators. Demand-related factors are grouped into sales/store variables and consumer/shopping measures. The latter is strongly focused on consumer satisfaction, the former on 'hard' data such as category sales, sales per square metre, DPP or ABC

FIGURE 2.5 Structures of measures in ECR



SOURCE: Aastrup *et al*, 2008

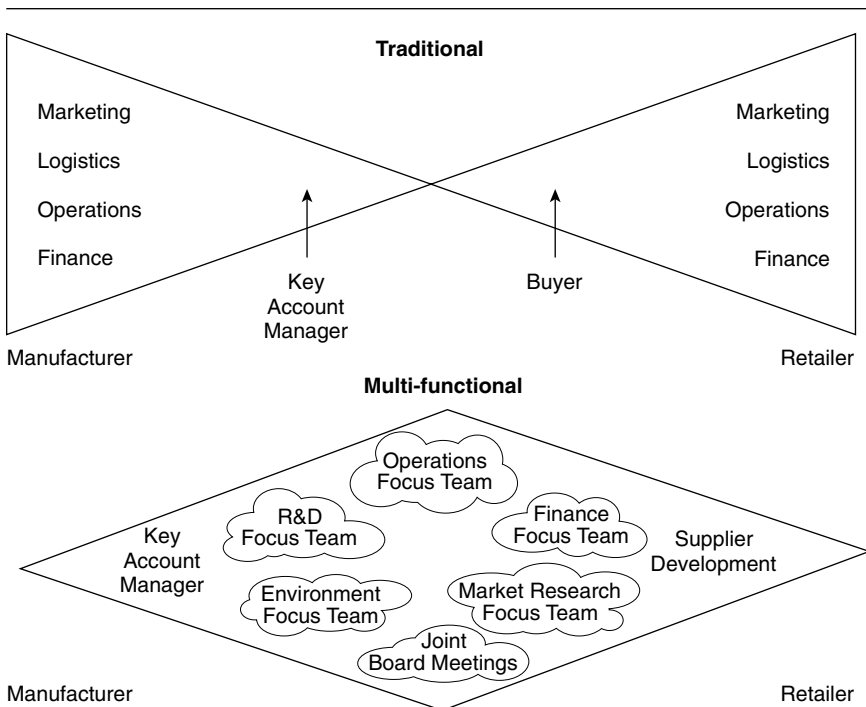
indicators. Supply-related measures can be classified into three areas: logistics costs, logistics reliability (service levels, on-shelf availability) and administrative accuracy (invoice accuracy and master data precision).

Retailers are becoming more sophisticated in their approach to demand and supply management and there has been considerable progress in moving from a traditional organizational structure, the 'bow tie', to a multi-functional team structure (Figure 2.6) as relationships changed between retailers and their suppliers (Table 2.4). ECR conferences are replete with examples of how category performance has been improved through enhancing the consumer experience 'in store' by remerchandizing traditional layouts. Such approaches are not only being adopted by major companies but also the small- to medium-sized retailers.

Each year the Scottish Grocers Federation conference highlights the success of category planning between major snack and soft drink manufacturers and their convenience store customers. After all, these businesses have limited store space and depend heavily on impulse purchases.

Although logisticians would prefer a consistent flow of product through the supply chain, tactical promotions remain a feature in many retailers' marketing strategies. Research by Hoch and Pomerantz (2002) on 19 food

FIGURE 2.6 Transformation of the interface between manufacturer and retailer



SOURCE: Fiddis, 1997

TABLE 2.4 Changing relationships between manufacturers and their suppliers

Current relationship	Target relationship
<ul style="list-style-type: none"> ● Adversarial Relationship ● Price ● Many Suppliers ● Functional Silos ● Short-Term Buying ● High Levels of Just-in-Case Inventory ● Expediting Due to Problems ● Historical Information ● Short Shipments ● Inefficient Use of Capacity 	<ul style="list-style-type: none"> ● Collaborative Relationships ● Total Cost Management ● Few 'Alliance' Suppliers ● Cross Functional ● Long-Term Buying ● Compressed Cycle Times & Improved Demand Visibility ● Anticipating Due to Continuous Improvement ● 'Real-Time' Information (EDI) ● Reliability focus ● Run Strategy & Synchronization

SOURCE: Coopers and Lybrand, 1996

product categories in 106 supermarket chains in the United States shows that price sensitivity and promotional responsiveness are much greater with high frequency 'staple' purchases. Compared with more specialist niche products, however, where greater variety and range built store traffic, staple products benefited from range reduction – a strategy which has been adopted by multinational FMCG manufacturers.

In order to integrate this demand-side planning with continuous replenishment, collaborative planning is necessary. The main catalyst to fostering integration has been the VICS initiative on CPFR, previously alluded to in the QR section. VICS, a non-profit organization, drew its membership primarily from US non-food retailers and their suppliers until the late 1990s when the grocery sector embraced the CPFR model. For example, Wal-Mart and Warner-Lambert are usually cited as key partners in sales forecast collaboration in the early/mid-1990s. The shift into grocery is hardly surprising in view of Wal-Mart's move into food through its supercentres in the United States and its overseas acquisitions of grocery businesses such as Asda in the United Kingdom.

By the late 1990s, VICS had produced a nine-step generic model bringing together elements of ECR initiatives – the development of collaborative arrangements, joint business plans, shared sales forecasts, continuous replenishment from orders generated. GCI has been the key player in globalizing this US initiative through collaboration between VICS, ECR Europe, other ECR country associations and global exchange groups.

Although the tenets of CPFR have been established, the implementation of the model remains patchy and like ECR initiatives will tend to focus on 'quick wins' where measurable profit enhancement or cost savings can be achieved. Most pilot schemes have involved a handful of partners dealing with specific categories. Companies come from a variety of technical platforms and 'cultures' of collaboration. Indeed, the likes of Wal-Mart, Tesco and Sainsbury's with their own intranet exchanges could actually impede more universal adoption of common standards!

Overall, however, to implement CPFR it is a prerequisite that a close working relationship has been fostered between trading partners in order to invest the necessary human resources to develop joint plans to generate real-time forecasts. In our discussion earlier on promotional activity, it is clear that more volatility of demand is evident here with price promotions, seasonal promotions and event planning. CPFR would generate greater benefits in these heavily promoted channels where over-stocks or out-of stocks are more evident than in high volume, staple, frequently purchased items where demand is more predictable.

Fernie *et al* (2004) undertook research into logistics practices and KPIs of leading grocery retailers in Europe. One aspect of the research was to establish the extent to which collaboration and information exchange occurred within the context of supply chain structures in country markets. Senior logistics directors/managers from 12 leading grocery retailers from six European markets were interviewed. Although all companies engaged in some degree of information sharing with suppliers, only two companies had an IT infrastructure to conduct this efficiently.

The VICS process model was deemed to be too complex and laborious for successful implementation. The companies that had most success with CPFR claimed that 'keeping it simple' was the key to success. The results show that certain pre-conditions are required to facilitate CPFR implementation, namely:

- advanced IT systems;
- a centralized decision-making structure;
- a scale to justify the costs incurred; and
- an integrated supply chain from supplier to store.

As indicated in other research, most schemes in operation were at the pilot stage and tended to be related to specific product categories or promotional campaigns.

The role of logistics service providers

Third party logistics providers are 'the missing piece in the ECR puzzle' (Roziemund, quoted in Mitchell, 1997, p 60). So much has been written on relationships throughout the supply chain, especially manufacturer–retailer

relationships, but the actual physical process of getting the products to the stores has been largely ignored. Yet the decision on whether to outsource or not is very similar to that of the 'make or buy' decision in operations management. Although we will focus our attention on logistics outsourcing here, ECR draws a range of third party activities into the equation. As companies move to become virtual organizations and concentrate upon their core competencies, relationships will be formed with IT providers, banks, advertising agencies and security companies in addition to logistics service firms. The theoretical work on outsourcing is based on the seminal work of Williamson (1979, 1990) on transaction cost analysis which has been further developed by Reve (1990) to a contractual theory of the firm and applied by Cox (1996) and Aertsen (1993) to supply chain management. In essence, these authors have revised Williamson's ideas on high asset specificity and 'sunk costs' to the notion of 'core competencies' within the firm. Therefore, a company with core skills in logistics would have high asset specificity and would have internal contracts within the firm. Complementary skills of medium asset specificity skills would be outsourced on an 'arm's length' contract basis.

Conceptual research tends to establish the context within which the outsourcing decision is taken. Much of this work emphasized that long-term relationships or alliances are being formed between purchasers and suppliers of logistical services (Bowersox, 1990; Gardner and Cooper, 1994 and McKinnon, 2003). Empirical work on the use of logistics service providers and their relationship with purchasing companies has tended to be biased towards surveys of US manufacturing companies with regard to both the provision of domestic and international outsourcing services (Gentry, 1996; Sink, Langley and Gibson, 1996; McGinnis, Kochunny and Ackerman, 1995; Lieb and Randall, 1996). Throughout the latter half of the 1990s and the 2000s, Langley *et al* (2002) have undertaken annual reviews of third party logistics in the United States involving a range of industrial sectors, including the retail sector. In 2002 the geographical scope of the survey was widened to include western Europe and Asia.

UK research has been largely driven by surveys by consultants or contractors, for example, CDC (1988) and Applied Distribution (1990) with the period surveys of PE International (1990, 1993, 1996) being the most comprehensive. Academic surveys have been limited to Fernie's exploratory work in the buying and marketing of distribution services in the retail market (Fernie, 1989, 1990) and two separate surveys on the role of dedicated distribution centres in the logistics network (Cooper and Johnston, 1990; Milburn and Murray, 1993).

These empirical surveys have shown that the contract logistics market has grown and the providers of these services have increased in status and professionalism. Logistics is no longer solely associated with trucking but warehousing, inventory control, systems and planning. However, the market is volatile and many of the reasons cited for contracting out such as cost, customer service and management expertise are also used to justify retention

of the logistical service ‘in house’. There is an impression that companies enter some form of partnership but in many cases lip service is being paid to the idea.

In a survey of British retailers by the author in the mid-1990s it was shown that outsourcing was of marginal significance to many British retailers, which have a tendency to retain logistics services ‘in house’ (Ferne, 1999). Indeed, retail management were much more positive about the factors for continuing to do so than for contracting out such services. Clearly retailers not only wished to maintain control over the logistics functions but feel that their staff could provide customer service at a lower cost. As with other industrial sectors, transport was the most likely logistics activity to be contracted out. Despite the growth of the third party market in the 1980s and 1990s, at that time a degree of saturation appeared to have been reached in that few companies expected to increase their proportion of contracting out in the future.

This has been borne out by the annual retail logistics surveys by the IGD which has indicated a levelling off in expenditure in outsourcing of transport and warehousing by supermarket chains. Nevertheless, since the Ferne (1999) survey, trends in retail logistics have changed the nature of third party support to focus more upon the primary network rather than the traditional regional distribution centre (RDC) to store business. Retailers, seeking to reduce inventory at RDCs, have incorporated primary consolidation centres in their logistics network to increase vehicle fill and increase frequency of deliveries. The notion of ‘dedicated distribution’ is less relevant now than when RDCs were initially rolled out in the 1980s and 1990s. Vehicles no longer return empty to RDCs after delivering to stores but either pick up loads from suppliers or return packaging waste for recycling. Finally, factory gate pricing (FGP) has taken these initiatives a step further through the coordination of vehicle planning to minimize vehicle movements throughout the primary and secondary network.

All of these changes will offer opportunities to logistics service providers (LSPs) although there will be winners and losers in this new contractual environment with a rationalization of transport provision. Similar trends are evident in the clothing sector, which has come under intense price competition. In the early 2000s, the demerger of Arcadia led to outsourcing the logistics support to stores; Matalan outsourced its logistics operation in 2003 and in order to save £20 million from its UK operation, Marks & Spencer continues to outsource but has rationalized its LSPs from five to two. The fast growing e-tailing company, ASOS, experienced difficulties in meeting customers’ needs with an evolving distribution network and eventually contracted out the operation to Unipart.

Much of this discussion has focused upon managing the logistics operation within the United Kingdom; however, global sourcing has become the norm for fashion retailers and their grocery counterparts have increased sourcing from overseas as they internationalize their store operations and establish buying centres around the world. This means that the ‘factory gate’ in FGP can be at the consolidation centre or port of entry of the country

where the goods are exported. The ‘core competences’ of retailers do not extend to coordinating an international supply chain with involvement in tasks such as freight forwarding and customs clearance. With the evolution of global players in logistics service provision through mergers and acquisitions, the primary international network leads to increased collaboration between retailers, buying centres, intermediaries and LSPs. This discussion will be developed in the next chapter.

The outsourcing decision is a complex one related to the size and historical evolution of the network. Companies with a long history of in-house logistics have ‘sunk costs’ within the organizations, equating with Williamson’s (1990) view on asset specificity, the contract relationship will be intra-organizational, that is between the retail and logistics departments in a company. Retail businesses with large, complex networks, however, have invariably developed relationships with logistics providers as they have moved into new geographical markets or new retail sectors. This has necessitated the use of complementary skills of medium asset specificity and the development of a range of contractual relationships of an inter-organizational nature (Cox, 1996).

This research showed that the transport function was most commonly outsourced, primarily because the core competencies required are of a residual nature with low asset specificity. Contracts are generally shorter and the relationship is more ‘arm’s length’ in nature or what Cox (1996) classified as an adversarial leverage type of relationship.

The role of the outsourcing decision has to be seen within the context of a retailer’s corporate strategy at discrete moments in a company’s history. Acquisitions or demergers, expansion or withdrawal from markets can all influence logistical decisions. No two companies are the same and invariably a third party provider is utilized to solve a particular logistical problem pertaining to a retailer’s investment strategy. This ‘horses for courses’ argument tends to support the work undertaken in the United States by Sink, Langley and Gibson (1996).

Conclusions

This chapter has illustrated the considerable research that has taken place into relationships through the supply chain.

A background to the theoretical constructs underpinning buyer–seller relationships was given drawing upon research from the marketing and logistics literature. The concepts of power and dependence, trust and commitment, cooperation and co-opetition were critically reviewed in the context of the retail sector. Much of the research on retailer–manufacturer relationships has focused upon the concepts of QR and ECR. The development of QR from its US origins to applications in the clothing sector in Japan was discussed to illustrate that QR has less relevance in the ‘fast fashion’ Japanese market. ECR, by contrast, has been embraced in numerous markets through-

out the world. The harmonization of the VICs model of CPFR with ECR Europe initiatives bodes well for future collaborative initiatives in the grocery supply chain. Finally, the role of third party logistics providers to instigate these strategic objectives was discussed. As the retail logistics environment changes – greater internationalization, integration of primary and secondary networks and reverse logistics – LSPs can capitalize on these marketing opportunities.

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The internationalization of the retail supply chain

03

John Fernie

The internationalization of retailing has attracted considerable academic attention in recent years. Although the retail industry is generally considered to be more ‘culturally grounded’ and therefore their foreign to total assets is lower than manufacturing sectors, the last decade has witnessed a major restructuring of the retail market place. The meteoric rise of Wal-Mart to become the largest corporation in the world with sales of around US\$444 billion for the fiscal year 2012 has re-shaped global competition in the food and general merchandise sectors. In the late 1990s/early 2000s, ‘mega groups’ began to dominate the global stage to compete with Wal-Mart, most notably Carrefour, Tesco, Ahold and Metro (Wrigley, 2002; Fernie and Arnold, 2002). At the same time, other retailers such as Marks & Spencer and J Sainsbury began to retract from international markets in order to compete more successfully in their own domestic market (Burt *et al*, 2002; Ayman and Burt, 2008). During the rest of the decade considerable research has been undertaken on the divestment activities of retailers (Alexander and Quinn, 2002; Burt *et al*, 2003, 2004, 2008) with considerable focus upon the financial crisis of the Royal Ahold group and their phased withdrawal from Latin America, Asia and parts of Europe (Wrigley and Currah, 2003; Palmer and Quinn, 2007). Palmer (2004) has also discussed re-structuring and divestment of Tesco’s portfolio. Since then, in late 2005 Tesco sold its Taiwanese operations to Carrefour for €132 million in return for Carrefour’s operations in the Czech Republic and Slovakia for €189.4 million and Tesco exited from the Japanese market in 2011. In 2011/12 both Tesco and Carrefour struggled in their domestic markets with

further speculation about possible withdrawal from other international markets. Tesco formally announced that it would withdraw from the United States in April 2013.

Despite all of the hype about international retailing, little has been written about the supply chain implications of the internationalization process. Sparks (1995) acknowledges that there are three main threads to understanding retail internationalization:

- international sourcing;
- international retail operations; and
- internationalization of management ideas.

Of these, most researchers have concentrated upon retail operations but by that they mean store, not logistics operations. Nevertheless, with the internationalization of key logistics concepts such as Quick Response (QR) and efficient consumer response (ECR), it quickly became apparent that countries were at very different stages of the adoption process of these concepts. Distribution 'cultures' vary within and between countries; hence companies seeking to expand into new markets need to be cognizant of the macro-environmental factors that they will face in these markets. This chapter will seek to explore how retail logistics has evolved in different market environments and how companies are transferring world-class logistics practices from market to market. Prior to discussing these issues, however, it is appropriate to comment upon international sourcing.

International sourcing

Although the current debate on global strategies of retailers takes the form of entry to new geographical markets, most retailers are already familiar with the internationalization process through their sourcing policies. In much the same way as manufacturers have sought 'offshore' production to reduce the costs of the manufactured product, retailers have looked beyond their domestic markets to source products of acceptable quality at competitive prices. It has been the apparel sector which has led in international sourcing policies with US, Japanese and European companies targeting low-cost labour areas in the Far East, North Africa, eastern Europe and Latin America for finished and semi-finished product. The lengthening of the supply chain clearly has given logistics managers of these companies a set of challenges in terms of the cost trade-offs with regard to better buying terms but increased distribution costs. The US company The Limited revolutionized the fashion retail market in the United States in the 1990s through its global procurement strategy which was underpinned by state-of-the-art technology from computer-aided design to electronic data interchange links with suppliers. Those suppliers in south-east Asia had their goods consolidated in Hong Kong from where chartered jumbo jets flew direct to their Columbus, Ohio

distribution centre (DC) for onward distribution to their stores. This enabled the company to turn its inventory twice as quickly as the average for a US speciality store.

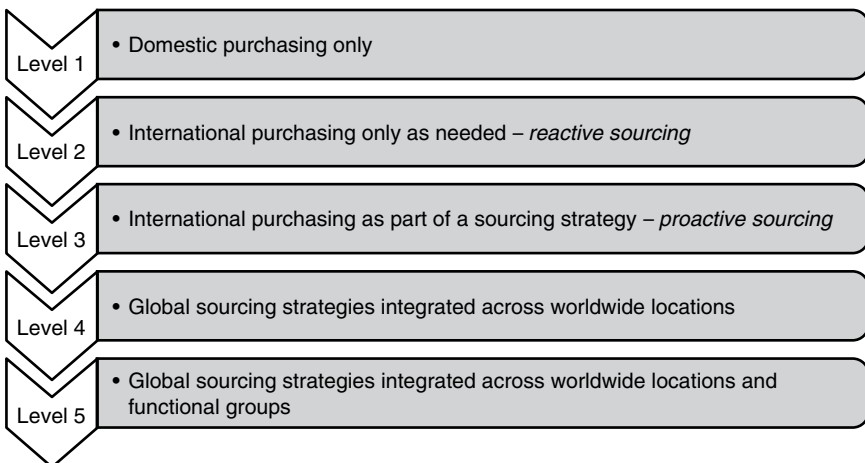
The literature on global sourcing emerged during the early seventies, when the benefits of purchasing offshore started to be realized (Matthyssens *et al*, 2006). Cost is the earliest determinant factor to be recognized in the literature; Leontiades (1971) and Leff (1974) argued that the shift of production to foreign (less developed) countries was due to low-cost production (Matthyssens *et al*, 2006). It was shown in the previous chapter that QR initiatives were initially introduced to give domestic suppliers an opportunity to compete with low-cost offshore suppliers. The enormous labour cost advantages that many of these countries have over their ‘developed’ counterparts, however, has meant that offshore QR has been implemented, for example fashion retailers in Japan sourcing from the Dongdaemun Market in Seoul, Korea (Azuma, 2002).

Monczka and Trent (1991) suggested a four-phase development process that progressed from domestic purchasing to global sourcing but in their later work added a fifth phase (Trent and Monczka, 2003, 2005). See Figure 3.1.

At the first level, companies are solely domestic purchasers, with no offshore sourcing activities of any kind, while the next level represents the progress towards international purchasing but on a need-only basis, like the non-existence of any suitable domestic supplier.

At the third level international purchasing becomes a part of the sourcing strategy, due to the recognition of the resulted performance improvements of the previous stage; it becomes a proactive strategy. However, the sourcing is not well coordinated on a global scale and it is driven by cost-related motivations.

FIGURE 3.1 The five levels of sourcing



SOURCE: Trent and Monczka, 2005

The next level (level 4) is the first of the two global sourcing levels. It features integrated and coordinated sourcing strategies across worldwide buying locations and it is characterized by coordination excellence. Operating at this level requires executive leadership that endorses the global perspective, highly skilled personnel, advanced information systems and an organizational structure that can coordinate global operations.

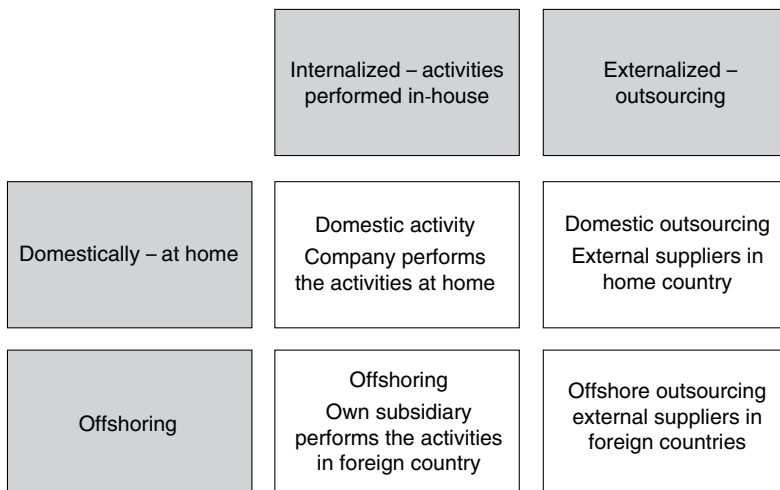
At the final level (level 5), companies coordinate and integrate their purchasing not only among geographical locations but also across functional groups like product development or marketing. In other words, there is a horizontal link between sourcing and other functions, particularly engineering, operations and marketing. Furthermore, design, product development and sourcing are assigned to the most competent units around the globe. Operating at this level requires worldwide design, product development and sourcing capabilities.

The main focus of research on sourcing has been on supply markets and supply channels which embraces the ‘the choice among various supply markets’ – geographical – and ‘the choice among various supply channels’ – internal/external (Åkesson *et al*, 2007, p 742).

It is important to note that the concepts of the geographical production location and whether the process is internal or external to the organization are mutually related (Pyndt and Pedersen, 2005); their combination can be classified as shown in Figure 3.2.

The evolution of the textile supply chain can be related to Figures 3.1 and 3.2 in that until the 1970s and early 1980s much sourcing was still at the early stages of the Trent and Monckza (2005) model and was domestic in nature. However, some companies such as Zara, Benetton and Burton

FIGURE 3.2 Framework that addresses the different combinations of offshoring and outsourcing



SOURCE: Pyndt and Pedersen, 2005

(in the United Kingdom) were vertically integrated companies that supplied their own stores; by contrast, Marks & Spencer was always known as a manufacturer without factories as it sourced from UK suppliers and stressed its Buy British credentials in its marketing campaigns. In the last 20 to 30 years, however, the position has changed dramatically with most fashion retailers (and belatedly Marks & Spencer) acknowledging that offshore sourcing from external suppliers was the preferred model. The exceptions to this rule are the luxury fashion houses that continue to produce high-quality goods in their domestic market to enhance their heritage brands, and Benetton which has developed foreign production poles in Spain, Portugal, Hungary, Croatia, Tunisia, Korea, Egypt and India based on the domestic Castrette model. These foreign production centres focus on one type of product utilizing the skills of the region, so T-shirts are made in Spain, jackets in Eastern Europe. These European platforms have been supplemented by hubs in Hong Kong, Taiwan and Shanghai.

In order to reduce time throughout the supply chain, Benetton has increased upstream vertical integration by consolidating its textile and thread supplies so that 85 per cent is controlled by the company. This means that Benetton can speed up the flow of materials from raw material suppliers through its production poles to ultimate distribution from Italy to its global retail network.

In contrast to these vertically integrated companies, many international clothing retailers have either developed strong partnerships with key suppliers or allowed 'intermediaries' to carry out the sourcing, coordination and logistics to their stores from overseas markets. In the mass 'supermarket' clothing sector Wal-Mart has been able to build upon the relationships fostered by George at Asda in Turkey (GATT – George and Atila Turkmen), to Latin American markets (*Retail Week*, 8 December 2006). This illustrates how a Turkish company developed its business by working in partnership with George Davies, then of Asda, to develop the business through sharing ideas on design, production and service. The Turkmen business has now grown to the extent that he not only produces for George but other clothing retailers and coordinates production from 75 factories in Turkey, Romania, Egypt and China.

In their paper on global fashion supply chains, Masson *et al* (2007) discuss how UK clothing retailers manage offshore production and distribution to the UK from two markets, China and Romania. In their research they 'found that the common norm, and of course, a practice that could eliminate complexities at a stroke, was simply for the retailers to make use of third party indirect sourcing import/export agencies or what many choose to call intermediaries' (pp 244–45). These intermediaries act as agents through coordinating a network of suppliers to produce to retailer demand from around the globe. Masson *et al* (2007) also classify some of these companies as integrated service providers in that they provide in-house services from product design through manufacture to logistics provision to customers' (retailers') DCs.

According to this definition, Li & Fung, the Hong Kong-based multinational is an integrated service provider. One of its main clients, The Limited, was discussed earlier in the chapter because of its innovative approach to reducing lead time to the US market. It was Li & Fung who were able to respond to The Limited's demand for yarns, specified by quantity, colour etc for the next season (Magretta, 1998). Li & Fung started as a Chinese export company in 1906 when China was dominated by foreign commercial houses. Now it is a quoted public company with 12,000 suppliers in 40 countries and offices throughout the world. Traditionally a sourcing business, it has two other divisions – retailing and distribution, that offer a range of facilities from sourcing, manufacturing, marketing and logistics to retailing (Fung, 2010).

Many companies wish to retain control over the sourcing function so while they offshore source, they continue to have a presence in these foreign markets, often through the use of international hubs. Many fashion retailers have key strategic hubs to coordinate both the buying and distribution function in order that better service can be obtained from suppliers and that goods can be distributed through key strategic locations. Fernie *et al* (2009) analysed the role of international hubs in a UK fashion company's sourcing strategy in relation to the Pyndt and Pederson and Trent and Monczka's taxonomies discussed in Figures 3.1 and 3.2. The case study company was committed to offshore sourcing but wished to retain control through a buying office and international hubs. In terms of Trent and Monczka's model the first two stages are not relevant and stage 4 is equivalent to that of the company's integrated international hub's structure. Each hub also had a strategic role; its Italian hub focused upon design and innovation for high value items such as tailored jackets, the Turkish hub provided cost and agility advantages to react to trends while the Hong Kong hub represented the lean supply model of low-cost production of basic items such as T-shirts and vest tops.

This confirms earlier research on sourcing by UK fashion firms where Birtwistle *et al*, 2003 commented that basic lines from the Far East can be ordered three months in advance, seasonal lines are augmented by east European and North African suppliers in three weeks and shorter runs of re-makes are manufactured by British companies. Through a series of case studies, Bruce, Daly and Towers (2004) also show how a combination of lean, agile and 'leagile' approaches have been taken by UK companies to reduce production costs from offshore sourcing while at the same time retaining capacity closer to home in order to be able to respond flexibly to an increasingly volatile fashion market.

It is not only the textile markets that have witnessed an increased globalization of sourcing, similar trends are evident in the grocery sector. As consumers acquire more cosmopolitan tastes and grocery retailers have developed their product ranges over the last 10 to 15 years, it is inevitable that many products cannot be sourced from the domestic market. Nonetheless grocery retailers in the United Kingdom invariably source some products

from other parts of the EU outwith the United Kingdom, not because of geographical or climatic reasons but because of the ability of non-UK suppliers to provide products in the volume, quality, variety and price to meet the demands of buyers.

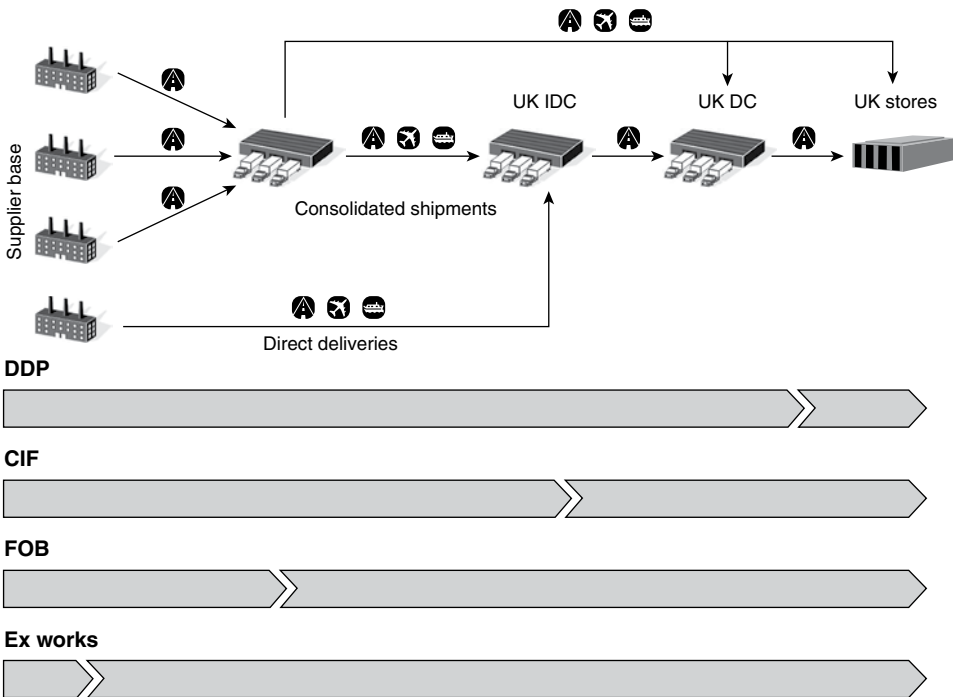
Furthermore, the increasing cosmopolitan tastes of a new generation of consumers has led to the creation of buying centres throughout the world by the 'mega groups' discussed earlier. The global expansion of these companies has fostered regional sourcing networks to introduce successful products into the chains' operations in new markets.

With the advent of factory gate pricing (FGP) by UK major grocery retailers, it is likely that the costs of product and transportation will be driven down as retailers exert more control further back down the supply chain. This is not to say that FGP is not being applied in the non-food sector. It is only that the non-food supply chain is longer and more complex than in the food sector. Thus both sectors are moving to the point of origin and therefore sourcing 'ex-works'. In non-food, however, 80 per cent of product is sourced from a non-UK supplier base, 90 per cent is moved by sea and therefore product lead times are longer with a larger margin of error in matching demand with supply than in the more 'local' food market (Jones, 2003).

In essence, the principles of logistics are the same. In food we have moved from direct deliveries from UK manufacturers' factories to stores to FGP and the efficient transportation of product from factory through consolidation centre, regional distribution centre (RDC) to store. In non-food, the change has been from delivery directly paid to FOB, where the vendor was still responsible for shipping from country of origin, to ex-works where the retailer controls the whole supply chain (Figure 3.3).

Jones (2003) illustrated this approach with Toys R Us's relationship with Exel, the logistics service provider. Exel, now part of Deutsche Post DHL, developed an end-to-end value-based solution to Toys R Us sourcing and logistics in China. Exel dealt with 800 suppliers across South China collecting goods and consolidating them at their Yantian distribution facility. Labelling and packing was carried out there prior to maximizing container fill for onward distribution to customers' DCs. Complementing this physical flow is product visibility through the use of Log Net, which allows the transmission of orders and a tracking facility to monitor shipments throughout the supply chain cycle.

As grocery retailers have moved into fashion and non-food as part of their expansion strategies, they have established sourcing hubs in key strategic locations. Tesco has a large-scale global sourcing division, Tesco International Sourcing (TIS), which is headquartered in Hong Kong. TIS uses more than 800 suppliers across 1,200 factories and employs 533 staff. The Hong Kong operation is the focus of sourcing, overseeing production, quality control and customs documentation for 50,000 of Tesco's product lines, mainly sourced from China although it has satellite hubs coordinating products from 44 countries.

FIGURE 3.3 The end-to-end supply chain

SOURCE: Jones, 2003

Differences in distribution 'culture' in international markets

It was shown in the last chapter how ECR principles have been adopted at different stages by different companies in international markets; also, new entrants to a market can change the distribution culture of that market. Differences in such markets are more likely to exist in the context of fast-moving consumer goods products, especially groceries, because of the greater variations in tastes which occur in not only national but regional markets. The catalyst for much of the interest in these international comparisons was the revealing statistic from the Kurt Salmon report in 1993 that it took 104 days for dry grocery products to pass through the US supply chain from the suppliers' picking line to the checkout. With the advent of ECR, it was hoped to reduce this time to 61 days, a figure that was still behind the lead times encountered in Europe, especially in the United Kingdom where inventory in the supply chain averages around 25 days (see the GEA, 1994 report for further details).

In 1997 Mitchell explained the differences between the United States and Europe in terms of trading conditions.

- the US grocery retail trade is fragmented not concentrated as in parts of Europe;
- US private label development is limited compared with many European countries;
- the balance of power in the manufacturer–retailer relationship is very different in the United States compared with Europe;
- the trade structure is different in that wholesalers play a more important role in the United States;
- trade practices such as forward buying were more deeply rooted in the United States than Europe;
- trade promotional deals and the use of coupons in consumer promotions are unique to the United States;
- legislation, especially anti-trust legislation, can inhibit supply chain collaboration.

Although Wal-Mart's penetration into new US markets and its growth of private label goods have been emulated by its competitors, many of these factors remain in force today. Around the same time Fernie (1994, 1995), cited the following factors to explain these variations in supply chain networks:

- the extent of retail power;
- the penetration of store brands in the market;
- the degree of supply chain control;
- types of trading format;
- geographical spread of stores;
- relative logistics costs;
- level of IT development;
- relative sophistication of the distribution industry.

Of these eight factors, the first three can be classified into those of a relationship nature, and the others as operational factors. Clearly there has been a significant shift in the balance of power between manufacturer and retailer during the last 20 to 30 years as retailers increasingly take over responsibility for aspects of the value-added chain, namely product development, branding, packaging and marketing. As merger activity led to consolidation of markets, retailers have grown in economic power to dominate their international branded manufacturer suppliers, especially in Europe. While there are different levels of retail concentration at the country level, the trend is for increased concentration as now in central, south and eastern Europe, French, German, British and Dutch retailers sought growth opportunities in these emerging markets.

Over 20 years ago, Ohbora *et al* (1992) argued that this power struggle is more evenly poised in the United States where the grocery market is more regional in character enabling manufacturers to wield their power in the market place. This began to change when Wal-Mart developed its supercentres and acted as a catalyst for the 'consolidation wave' throughout the 1990s and early 21st century (Wrigley, 2001). Nevertheless, the immense size of the United States has meant that there has never been a true national grocery retailer.

Commensurate with the growth of these powerful retailers has been the development of distributor labels. This is particularly relevant in Britain whereby supermarket chains have followed the Marks & Spencer strategy of strong value-added brands that can compete with manufacturers' brands. In the United Kingdom, a levelling out of own brand penetration has been realized whereas growth has occurred in the rest of Europe and other markets. The own label market has been segmented into basics, standard and premium ranges whereas in other markets emphasis remains on price compared with manufacturers' brands. Planet Retail forecast that by 2020, own label would account for 30 per cent of global food sales compared with 20 per cent in 2004 (Planet Retail, 2004). More recent reports by the consultancy suggests that the economic downturn since 2008 has accelerated the trend to private label and unlike previous recessions when consumers went back to manufacturers' brands this is unlikely this time. Retailers are developing super premium brands and covering niche markets such as organic and ethnic ranges. The net result of this shift to retail power and own label development has meant that manufacturers have been either abdicating or losing their responsibility for controlling the supply chain. In the United Kingdom the transition from a supplier-driven system to one of retail control is complete compared with some parts of Europe and the United States.

Of the operational factors identified by Fernie (1994), the nature of trading format has been a key driver in shaping the type of logistics support to stores. For example, in the United Kingdom the predominant trading format has been the superstore in both food and specialist household products and appliances. This has led to the development of large RDCs for the centralization of stock from suppliers. In the grocery sector, supermarket operations initially introduced composite warehousing and trucking whereby products of various temperature ranges were stored in one warehouse and transported in one vehicle. This was possible because of the scale of the logistics operation, namely large RDCs supplying large superstores. Further upstream primary consolidation centres have been created to minimize inventory held between factory and store. The implementation of FGP further reinforces the trend to retail supply chain control with an integrated logistics network. In recent years, however, grocery retailers have moved into new product markets and have offered a range of formats for their consumers. This has necessitated a re-configuration of their logistics infrastructure.

The size and spread of stores will therefore determine the form of logistical support to retail outlets. Geography also is an important consideration in terms of the physical distances products have to be moved in countries such as the United Kingdom, the Netherlands and Belgium compared with the United States and to a lesser extent, France, Germany and Spain. Centralization of distribution into RDCs was more appropriate to urbanized environments where stores could be replenished regularly. By contrast, in France and Spain some hypermarket operators have few widely dispersed stores often making it more cost-effective to hold stock in store rather than at an RDC. The failure of Wal-Mart's attempt to introduce centralized distribution in Germany can be attributed to the relative few number of acquired stores, especially from Wertkauf, spread over a large geographical area (see the discussion on Wal-Mart on pages 73 and 74).

The question of a trade-off of costs within the logistics mix is therefore appropriate at a country level. Labour costs permeate most aspects of the logistics mix – transport, warehousing, inventory and administration costs. Not surprisingly dependence on automation and mechanization increases as labour costs rise (the Scandinavian countries have been in the vanguard of innovation here because of high labour costs). Similarly, it can be argued that UK retailers, especially grocery retailers, have been innovators in ECR principles because of high inventory costs, because of high interest rates in the 1970s and 1980s. This also is true of land and property costs. In Japan, the United Kingdom and the Benelux countries, the high cost of retail property acts as an incentive to maximize sales space and minimize the carrying of stock in store. In France and the United States the relatively lower land costs leads to the development of rudimentary warehousing to house forward buy and promotional stock.

In order to achieve cost savings throughout the retail supply chain, it will be necessary for collaboration between parties to implement the ECR and CPFR principles discussed in the previous chapter. Research by Aastrup *et al* (2008) on the relative success of ECR concepts in Austria and Denmark showed that a lack of collaboration, especially on sharing forecasts and plans was a barrier to successful ECR implementation. Similarly, the work of Fernie *et al* (2004) highlighted the importance of advanced IT systems and a centralized decision-making structure in realizing CPFR objectives in European markets.

As mentioned in the previous chapter, one area of collaboration that is often overlooked is that between retailer and professional logistics contractors. The provision of third party services to retailers varies markedly by country according to the regulatory environment, the competitiveness of the sector and other distribution 'culture' factors. For example, in the United Kingdom the deregulation of transport markets occurred in 1968 and many of the companies that provided dedicated distribution of RDCs to grocery retailers were the same companies that acted on behalf of suppliers when they controlled the supply chain 30 years ago. Retailers contracted out because of the opportunity cost of opening stores rather than RDCs,

the cost was 'off balance sheet' and there was a cluster of well-established professional companies available to offer the service. It should be noted, however, that most of the major grocery retailers have revamped their distribution networks in the last 10 years and manage most of the operation 'in house'. The situation in terms of logistics service providers (LSPs) was different in other geographical markets. In the United States, deregulation of transport markets was relatively late, hence third party logistics was much less developed. Warehousing was primarily operated by the retailer while transportation was invariably contracted out to local haulers. In China, the market has moved from a command economy and state-controlled logistics network to a mixed economy approach and the gradual encouragement of foreign entrants. This has led to the incorporation of best practice principles (Liu, 2008). Similarly the progressive deregulation of EU markets began to break down some nationally protected markets. Nevertheless, most European retailers, like their US counterparts, tend to only contract out the transport function. Compared with the United Kingdom, the economics of outsourcing is less attractive. Indeed, in some markets a strong balance sheet and the investment in distribution assets is viewed more positively than in the United Kingdom.

Although LSPs have their origins in national markets often with particular specialisms (Christian Salvesen with frozen food, Tippet and Britten in clothing) most famous names of UK logistics have disappeared since the beginning of the new millennium. The internationalization of business has led to the internationalization of LSPs. Mergers and acquisitions have been a feature of the LSP sector in order to achieve scale economies in a global market. Exel Logistics bid for Tippet and Britten in 2004 only to be taken over by DHL Logistics (Deutsche Post) in 2005. Many of the LSPs in the United Kingdom are now in foreign ownership.

The internationalization of logistics practices

The transfer of 'know how', originally proposed by Kacker (1988) in reference to trading formats and concepts, can be applied to logistics practices. Prior to withdrawing from the European market, Marks & Spencer's European retail strategy initially was supported from DCs in southern Britain. As French and Spanish markets were developed, warehouses were built to support these stores in Paris and Madrid respectively. Another dimension to the internationalization of retail logistics is the internationalization of LSPs, many of whom were commissioned to operate sites on the basis of their relationship with retailers in the United Kingdom. In the above Marks & Spencer example, Exel was the contractor operating the DCs in France and Spain.

Another method of transferring ‘know how’ is through retail alliances. Throughout Europe, a large number of alliances exist, most of which are buying groups (Robinson and Clarke-Hill, 1995). In the 1990s some of these alliances promoted the cross-fertilization of logistics ideas and practices such as the Safeway, Casino and Ahold alliance at that time. Composite distribution was developed by Safeway’s European partners and as these companies moved into new international markets best practice principles were applied to these new geographical areas. Again LSPs tended to follow the market with Tibbett and Britten providing support to retailers in Europe and North America.

The expansion of the retail giants with their ‘big box’ formats into new geographical markets is leading to internationalization of logistics practice. The approach to knowledge transfer is largely dependent upon the different models of globalized retail operations utilized by these mega groups. Wrigley (2002) classified these retailers into two groups, one following the ‘aggressively industrial’ model, the other the ‘intelligently federal’ model (Table 3.1). In the former model, to which Wal-Mart and to a lesser extent Tesco can be classified, the focus is upon economies of scale in purchasing and strong implementation of the corporate culture and management practices. Hence, Tesco’s implementation of centralized distribution in Ireland, the incorporation of a chilled ‘composite’ facility and the use of best practice ECR principles developed in the United Kingdom in Ireland. In developing markets such as in Eastern Europe and Asia, Tesco initially instilled

TABLE 3.1 Alternative corporate models of globalized retail operation

‘Aggressively Industrial’	versus	‘Intelligently Federal’
Low format adaptation	–	Multiple/flexible formats
Lack of partnerships/alliances in emerging markets	–	Partnerships/alliances in emerging markets
Focus on economies of scale in purchasing, marketing, logistics	–	Focus on back-end integration, accessing economies of skills as much as scale, and best practice knowledge transfer
Centralized bureaucracy, export of key management and corporate culture from core	–	Absorb, utilize/transfer, best local management acquired
The global ‘category killer’ model		The <i>umbrella organization/ corporate parent</i> model

SOURCE: Wrigley, 2002

discipline with regard to quality assurance for a very fragmented supplier base. Development programmes for a large number of small suppliers were necessary prior to rolling out the Tesco Operating Model to these markets based on the UK supply chain approach (see Chapter 7 on Tesco's supply chain for more details). Wal-Mart, however, is the best example of the aggressively industrial model. In Europe, for example, it tried to integrate buying across the acquired chains in Germany and the United Kingdom.

The problem here for Wal-Mart was its size in the German market. It did not bring in sufficient volumes to warrant significant discounts from suppliers to justify central distribution (Fernie *et al*, 2006). Clearly Wal-Mart had intended to acquire further stores in Germany to achieve such scale economies but its acquisition efforts came to nothing. The initial two acquired chains had a widely dispersed store network leading to high transport costs from the two DCs (see Figure 3.4). Eventually, after eight years without breaking even, Wal-Mart withdrew from Germany selling to Metro in 2006.

In the United Kingdom, Wal-Mart's impact on Asda's logistics has been mainly in enhancing IT infrastructure and re-configuring its distribution network to supply the increase in non-food lines. Asda incurred much debt because of its expansion plans in the 1980s so it did not invest in stores or IT systems to the same extent as its rivals in the 1990s. Wal-Mart revolutionized Asda's Electronic Point of Sale and stock data systems in Project Breakthrough, which commenced in 2000 and was rolled out to stores, depots and finally Asda House by late 2002. The incorporation of Wal-Mart's Retail Link system has allowed greater coordination of information from till to supplier, reducing costs and enhancing product availability. Sparks (2011) has argued that Asda has become a better retailer after 10 years of Wal-Mart ownership. By improving sales/gross floorspace ratios in store, increasing non-food merchandising and benefiting from Wal-Mart's global sourcing networks, Asda could keep costs down and focus on everyday low prices as a competitive weapon.

Ahold, by contrast, adheres to the intelligently federal model. It has transformed logistics practices through its relationships in Retail Alliances and through synergies developed with its web of subsidiaries. In the United States, for example, it has retained the local store names post-acquisition and adopted best practice across subsidiaries. Furthermore, it shares distribution facilities for its own label and non-grocery lines.

FIGURE 3.4 Wal-Mart's stores and DCs in Germany



SOURCE: Fernie et al, 2006

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The international fashion supply chain and corporate social responsibility

Patsy Perry, John Fernie and Steve Wood

Introduction

Major changes have occurred in the fashion retail environment over the past 30 years. The main drivers of this evolution in the late 1980s and 1990s included the rise of the retail brand, its increasing internationalization, as well as the further segmentation of the market. By the late 1990s, more significant changes were occurring as affordable style was increasingly appearing on the high street. To a significant degree, this was driven by retailers such as Zara and H&M, marking a departure from an era where well-made, stylish clothes were only the preserve of affluent consumers, with fashion increasingly regarded as having been ‘democratized’ (Tungate, 2008; Lopez and Fan, 2009). At the same time, the fashion supply chain was transformed from a manufacturer-push to a demand-led pull system; from a domestic to an off-shore sourcing strategy by retailers; and saw an increased focus on retailers outsourcing supply chain functions to concentrate instead on their core competences in the design, branding and retailing of fashion products. (Castelli and Brun, 2010). However, with increasing internationalization and outsourcing of the manufacturing function to developing countries, ethical transgressions have become a key supply chain challenge, as the fashion industry became a focal point for debate on sweatshops, child labour and worker exploitation (Rosen, 2002; Smestad, 2009).

The purpose of this chapter is to discuss the impact of the internationalization of the fashion retail supply chain on the management of corporate social responsibility (CSR), with specific reference to Sri Lanka, a country noted for its 'Garments without Guilt' ethical manufacturing initiative and its strong CSR ethos. The chapter will discuss the evolving nature of international retailer–supplier relationships within the context of fashion retailer typologies, the sourcing models adopted and the product categories sourced by retailers. The Sri Lankan garment industry will be reviewed prior to briefly discussing the qualitative research undertaken with a sample of export garment suppliers.

The internationalization of the fashion supply chain

The high street fashion market is a dynamic industry sector, characterized by short product lifecycles, high product variety, low predictability, relatively low margins and high levels of impulse purchasing (Bruce *et al*, 2004; Masson *et al*, 2007). Fashion markets face combined pressures for shorter lead times and reduced costs (Masson *et al*, 2007). Amid a backdrop of such challenging conditions, success or failure in the high street fashion sector is largely dependent on organizational flexibility and responsiveness (Christopher *et al*, 2004). Supply chain management (SCM) becomes increasingly important and is recognized as a major source of competitive advantage (Croom *et al*, 2000). SCM innovations have considerable potential to deliver commercial benefits by managing the process from fibre to store by minimizing cost and lead time (Barnes and Lea-Greenwood, 2006).

Vertical disintegration and the outsourcing of production

One of the key SCM trends within the mid-market high street sector has been the vertical disintegration and outsourcing of the production function to a global network of independent subcontractors. The expansion of free trade following elimination of the Multi-Fibre Arrangement (MFA) (the MFA governed the global trade in textiles and garments between 1974 until the start of 2005, imposing quotas on the amount developing countries could export to developed countries) resulted in a greater number of apparel producers across a wider variety of countries (Abernathy *et al*, 2006). The degree of outsourcing relates to retailers' perspectives on the extent of control that it wishes to exert over the supply function and how it views sourcing within the organization. This distinction can be linked to Cox's (1996) contractual theory of the firm, whereby a company that considers sourcing to be a core competence with high asset specificity will retain

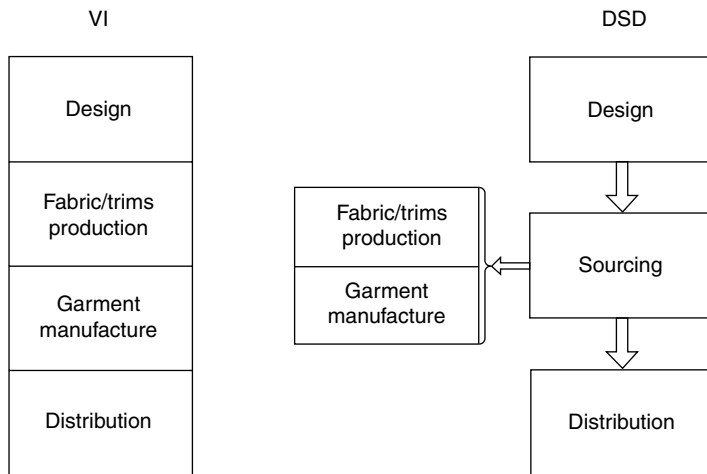
control of this function rather than use third party specialists. The extent of the relationship with the third party will depend on the degree of asset specificity – high asset specific skills will tend to be governed via long-term partnership arrangements, while low asset specific skills will be procured via arm's-length market-based arrangements.

Historically, the luxury segment of the market was structured in a vertically integrated manner, to allow those luxury brands to retain control over merchandise quality and exclusivity, and thereby to demand premium prices for their products (Brun *et al*, 2008). French couture houses such as Chanel and Hermès therefore tend to internalize the production function in order to retain control over quality and to protect the artisan skills that underpin the production of bespoke luxury goods, which is paramount for protecting brand values. In 2012, Chanel bought its long-term cashmere supplier in Scotland (BBC, 2012), while in recent years luxury groups, including Kering (formerly PPR) and LVMH have acquired a number of exotic skin suppliers and elite tanneries as part of a strategic move to secure a sustainable supply of high-quality raw materials (Socha, 2013). However, the luxury fashion sector is certainly not homogenous (Caniato *et al*, 2011) and there is some movement towards a networked structure. For example, in 2011, up to 20 per cent of the Italian couture house Prada's collections across clothing, shoes and handbags were reported to have been made in China, with some manufacturing also taking place in Turkey and Romania (Sanderson, 2013), with a similar tendency towards using full package overseas suppliers discussed in the case of Burberry (Tokatli, 2012). Globalization, heightened competition, advances in IT and the changing nature of the luxury consumer have resulted in a greater level of complexity and turbulence in the market; hence, flexible modular organizations are viewed as sometimes more effective than vertical integration (Djelic and Ainamo, 1999).

In the mid-market segment, the vertical integration model is rare, with a predominant global shift of production to newly emerging markets, as retailers respond to and, in doing so, create further downward price pressure. Mass outsourcing was facilitated by a combination of geopolitical reasons (end of quotas), market needs (increased competition) and technological advancements (information technology and transport improvements) (Fernie and Azuma, 2004; Djelic and Ainamo, 1999). For example, in 2008, fast fashion chain H&M used 800 suppliers worldwide (H&M, 2008). Even Spanish fast fashion retailer Zara is no longer an exception to the globalization of production. While traditionally sourcing from Spain and Portugal, Zara has expanded its supplier base to include lower cost countries such as Morocco, Turkey and India, finding that suppliers are able to respond quickly and to the standard required (Tokatli, 2008).

Thus, retailers and brands increasingly move towards a design/source/distribute model by focusing on their core competences of design, branding and retailing, with the production function outsourced to global networks of independent suppliers, as shown in Figure 4.1.

FIGURE 4.1 Supply chain models in the fashion industry: vertical integration (VI) and design/source/distribute (DSD)



The main driver for the global shift of production to developing countries is cost, given the labour-intensive nature of apparel production and the large differential in labour rates. Garment manufacturing is not suited to extensive automation due to the flexible properties of fabric. Meanwhile, the low-tech nature of much garment manufacturing means that labour-intensive sewing operations can be located where there is a readily available labour source, and potentially be moved from one low cost country to another according to business requirements (Sethi, 2003). As countries progressively industrialize and economic development grows, labour rates increase and competitive advantage on the basis of cost moves successively to the next newly industrializing country where labour rates are even cheaper. For example, Hong Kong, South Korea and Taiwan were popular sources of low-cost manufacturing labour, but by the beginning of the 1990s, rising domestic labour costs meant they were no longer competitive on a purely cost basis (Singleton, 1997). More recently, as labour rates in China's coastal areas have increased, garment manufacturing operations for longer lead-time products have relocated to cheaper inland regions (Zhu and Pickles, 2013). Zhu and Pickles (p 24) argue that central government in China has responded with a series of policy initiatives to support enterprises to encourage industrial upgrading and relocation in three ways: Go Up (industrial upgrading), Go West (relocation to inland China) and Go Out (relocation overseas). Likewise, as costs in Turkey have increased, some garment manufacturers have shifted production for shorter lead-time merchandise to nearby Egypt (Tokatli and Kizilgün, 2010). One response to this 'race to the bottom' has been for some individual supplier firms or wider economies to 'move to more profitable and/or technologically sophisticated

capital- and skill-intensive economic niches' – something referred to in the research literature as 'industrial upgrading' (Gereffi, 1999, p 52; see also Tokatli, 2007; Neidik and Gereffi, 2006). We discuss this a little later in this chapter.

In certain cases, garment sourcing decisions may be influenced by historic regional specializations. These are not easily replicated and result in certain countries becoming manufacturing centres for particular types of garment, based on the quality of the basic fabric (eg Southern India for silks), proximity to fabric source (eg China for cotton), specialization in design and production (eg Italy for leatherwear and tailoring), and particular highly skilled sewing details (eg India for hand embroidery and embellishment) (Dunford, 2006; Fernie and Perry, 2011). Sometimes, a specialized labour skill-base combines with cost advantages – for example, the existence of skilled workers in the East-Central European apparel industry enabled the region to develop a reputation for relatively high value tailored garments, which complemented its cost and proximity advantages (Begg *et al*, 2003; see also Kalantaridis *et al*, 2008; Smith *et al*, 2008). However, despite the existence of regional pockets of specialization, suppliers continue to face price pressure from low cost developing countries.

Supply chain relationships and responsiveness

The shift to independent flexible supply chain networks has brought an increased focus on supply chain relationship management. This focus can be traced back to the 1980s and the Quick Response (QR) concept. Introduced in the United States in 1985, QR was a response to inefficiencies in the domestic supply chain in the wake of Japanese textile imports and part of the 'Pride with the USA' campaign to promote the purchase of US products. QR performance relied upon a network of close alliances with supply chain partners, since such collaborative relationships are a precursor to responsiveness (Sheridan *et al*, 2006). By improving supply chain efficiency and promoting collaboration between retailers and suppliers, it was hoped to make the United States more competitive in the face of increasing imports. In the United Kingdom, QR techniques were used to develop collaborative working relationships, which enabled domestic manufacturers to compete with the off-shore sourcing of garments from lower labour cost countries (Christopher *et al*, 2009; Emberson and Storey, 2006). QR was originally targeted at core fashion lines that had steady demand profiles and were sold in department stores (Wood, 2002). Nowadays, core fashion lines with relatively steady demand profiles are typified by good quality casual garments, such as chinos and plain jeans, which are fashionable but not as time-sensitive as fast fashion.

Although QR was unable to prevent the large scale global shift of production to lower labour cost countries (Tokatli *et al*, 2008), it laid the foundations for companies to adopt a 'fast fashion' strategy, whereby retailers

such as Zara, Primark and ASOS replicate catwalk and celebrity trends quickly to provide budget versions for their customers. Spanish retailer Zara harnesses its supply chain to deliver catwalk looks into stores within two weeks (Tokatli, 2008), while other retailers in the fast fashion sector may count as many as 20 planned seasons per year (Christopher *et al*, 2004).

Progressively, traditional buyer–supplier relationships in the fashion industry that had been short term and adversarial, characterized by multiple sourcing, price orientation and competitive bidding (Jones, 2006; Barnes and Lea-Greenwood, 2006; Hines and McGowan, 2005), have now changed to exhibit greater degrees of vertical disintegration. These ‘*buyer-driven* global sourcing networks’ (other terms used in the research literature include ‘buyer driven commodity chains’ and ‘global buyer driven networks’) have seen the balance of power in the supply chain shift comprehensively to large retailers at the expense of manufacturers (Gereffi *et al*, 2005; Hines and McGowan, 2005). Buyer-driven global sourcing networks are led by powerful retail buyers who are able to exert control over all aspects of production, distribution and retail (Gereffi *et al*, 2005; Barrientos and Smith, 2007) by leveraging their dominant position in the network to dictate terms to manufacturers. Meanwhile, as discussed earlier, shorter product lifecycles and rapidly changing consumer demands have led to a renewed focus on agility as a means of reducing lead times. The industry has therefore seen an increasing shift away from adversarial relationships to strategic partnerships based on commitment, trust and continuous improvement (Bixenden and Abratt, 2007; Hines and McGowan, 2005) and the development of long-term upgraded supplier capabilities (Tan, 2001; Christopher and Peck, 1997).

To achieve competitive advantage by agility and responsiveness, supply chain initiatives based on collaboration, such as using integrated systems and encouraging supplier upgrading, may be employed (Griffiths *et al*, 2001; Bruce and Daly, 2011). Collaboration between supply chain partners can lead to significant business performance improvements (Vereecke and Muylle, 2006), potentially creating a seamless, synchronized chain which results in better responsiveness and reduced inventory costs (Holweg *et al*, 2005). Building supplier partnerships is thus an important influencing condition of successful fashion SCM (Hines and McGowan, 2005). Rather than seeking price reductions in short-term transactions, long-term oriented firms rely on a series of relational exchanges to maximize their profits over a series of transactions by achieving synergy between parties and risk sharing (Ganesan, 1994). For fashion products in particular, closer trading relationships are necessary to maximize supply chain effectiveness and efficiency in terms of reducing lead time and maximizing stock availability. Innovative products with unpredictable demand profiles require a higher degree of harmonization between buyer and supplier than functional products with more predictable demand profiles (van Donk and van der Vaart, 2005). As such, many larger retailers are moving towards rationalization of their global supply networks, in order to reduce costs and develop closer partnerships with

a fewer number of ‘preferred’ suppliers (Welford and Frost, 2006; Palpacuer *et al*, 2005).

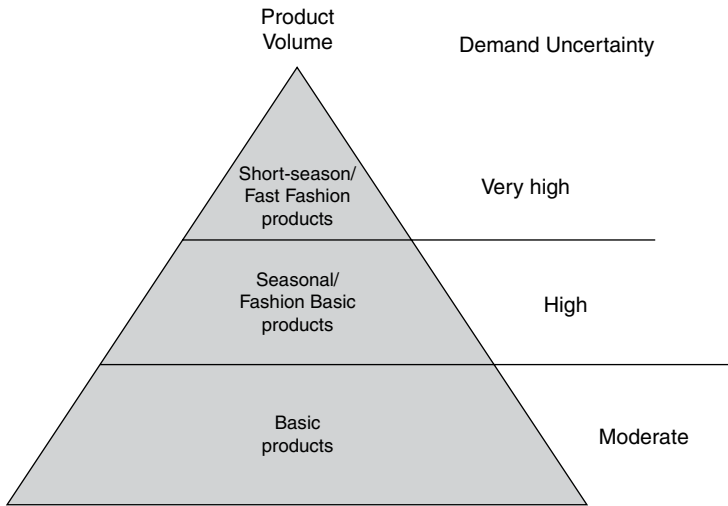
Different trading relationships have developed within specific fashion retail sectors according to the nature of the product, which influences the design and complexity of the supply chain and consequently the relationships between trading partners (Fisher, 1997). Fashion merchandise can be segmented into three major categories according to product lifecycles, sensitivity/time/cost requirements and subsequent supply chain geographies (Lowson, 2003):

- basic products: little variation in style, predictable demand profile, eg plain black socks, plain white T-shirts;
- seasonal (or fashion basic) products: greater variation in style, less predictable demand profile, eg chino trousers, straight leg jeans;
- short-season (or fast fashion) products: great variation in style, unpredictable demand profile, eg owl-print T-shirts, mullet-hem skirts.

While supply chains for *basic products* focus on cost reduction and prioritize lean supply, *fast fashion products* require agility in order to match supply to demand (Childerhouse and Towill, 2000; Mason-Jones *et al*, 2000). For basic products, such as black socks or white T-shirts, which are typically low-margin, have a long product lifecycle and predictable demand, a highly efficient supply chain ensures physical costs, such as production and distribution, are minimized. Where there is stable, predictable demand, a lean manufacturing strategy can improve supply chain efficiency by eliminating waste, including time (Mason-Jones *et al*, 2000); resulting in lower labour costs, increased throughput and hence operating profit (Frohlich and Westbrook, 2001). Supply chains for these functional products are less complex than for fashion products and thus can be simplified in order to maximize efficiency and reduce transaction costs.

Conversely, *short-season* or *fast fashion products* are less price-sensitive, but have a shorter product lifecycle and unpredictable demand levels; therefore the supply chain must achieve a high level of effectiveness in terms of manufacturing flexibility and minimizing lead time (Fisher, 1997). The different demand profiles for basic and fashion products are illustrated in Figure 4.2. The pyramid shape shows that fashion basic products with longer product lifecycles, such as chinos or straight-leg jeans, have long-running orders of each particular style, while fashion products with short product lifecycles, such as owl-print T-shirts or mullet-hem skirts, are made in small amounts of frequently changing styles. The time-sensitive nature of *seasonal (fashion basic)* and *short-season (fast fashion) products* prioritizes lead time over cost.

As fashion product lifecycles have speeded up, and more so with the rise of fast fashion in the 2000s, retailers have faced increasing challenges of managing the trade-off between cost and lead time in off-shore sourcing.

FIGURE 4.2 Demand pyramid: basic vs fashion items

SOURCE: based on Lowson, 2003

Fast fashion lines are often produced closer to the selling market to avoid missing the short window of the selling season. For UK retailers, fast fashion is often produced in Turkey or Eastern Europe, partly to avoid the long shipping times from Asia but also as they are locations that mediate between the demands of cost, quality and responsiveness/distance (Tokatli and Kizilgün, 2009, 2010). Similarly, for US retailers, the decision to source from Mexican, Caribbean or coastal Chinese suppliers is based on lead times of three, five and 11 weeks respectively (Abernathy *et al*, 2006). Flexibility and responsiveness are crucial in fashion markets with unpredictable demand and high levels of uncertainty, since success is based on aligning garment delivery to emerging consumer demand in order to avoid the costs of excess inventory and obsolescence (de Treville *et al*, 2004; Weller, 2007).

In addition to fast fashion retailers, the high street market segment also contains mid-market retailers that primarily sell seasonal or fashion basic products. The latter outsource most production to a small number of key suppliers with whom they have collaborative relationships, while the former face greater pressure for both cost and lead time and therefore tend to rely on short-term, arm's-length trading relationships. Because of the short product lifecycles of fast fashion, retail buyers tend not to place long-running orders, but rather small batches which may be easily moved from one supplier to another. For example, budget fast fashion retailer Primark's business model has been based on sourcing products from the cheapest possible supplier, with short and variable trading relationships, sometimes even changing supplier mid-season (Newton Responsible Investment, 2005).

Fashion retailers source garments in three ways: (1) via third party specialists; (2) directly from suppliers via their own headquarters; or (3) via overseas sourcing hubs (Ferne *et al.*, 2009). If sourcing directly, retailers use contract manufacturers ('cut-make-trim' – CMT) who cut, assemble and ship finished garments from imported inputs under the buyer's brand name, or full-package suppliers who coordinate the entire production process on behalf of the buyer, from product development and procurement of raw materials through to manufacture and shipping (Neidik and Gereffi, 2006). Full package supply requires pre-production capability in design and product development, as well as responsibility for sourcing fabric, including financing the procurement upfront.

Retailers generally prefer full package supply rather than CMT (Lezama *et al.*, 2004; Palpacuer and Parisotto, 2005), so that they can focus on their core competences in design, branding and retailing. In order to fulfil such demands, suppliers need to upgrade their capabilities to adapt to these buyer-led 'full package' demands (Gereffi, 1999; Gereffi and Memedovic, 2003; Tewari, 2006; Palpacuer, 2006). By ensuring key capabilities, such as fabric production, are in-house, lead times can be reduced and extra duties payable on imported fabrics can be avoided. Tewari (2006, p 2327) noted an increasingly demanding situation for suppliers as 'market access... depends not only on low costs, or freer trade, but on the ability of local suppliers to meet increasingly stringent buyer demands for quality, customization, and full-package supply, in addition to low costs'. Indeed, some full package manufacturers now have responsibility not only for procurement of fabric and trims but also for design and product development (Tokatli and Kizilgün, 2009), functions that would have previously been classified as core operations and therefore viewed as important to remain within the boundaries of the firm (Reve, 1990; Cox 1996). Given the increasing demands of dominant retailers, it has become progressively more important for suppliers to develop upgraded networks of design and manufacturing, which offer a comprehensive and responsive service but from a low cost base.

The typology of fashion retailers in Figure 4.3 summarizes the key differences in international supply chain relationships according to market segment. In addition to cost and lead time pressure, a further SCM challenge in recent times has been the management of ethical issues in complex and fragmented global sourcing networks (Hughes *et al.*, 2007) – something made more challenging in the current economic downturn (Hughes, 2012). Although worker exploitation may be found in a range of industry sectors, the fashion industry is particularly at risk as it is a high profile consumer segment which attracts the scrutiny of the global media and the general public (Jones, 1999). For example, in 2010, following a media investigation into Indian garment suppliers, fashion retailers Gap, Next and Marks & Spencer faced strong media scrutiny of alleged inhumane working practices, such as long hours, wage violations and forced labour (Chamberlain, 2010). More recently, in 2013, a number of Western fashion retailers were implicated in the tragedy of the garment factory building collapse in Dhaka,

FIGURE 4.3 Typology of fashion retailer supply chain relationships

<i>Vertically integrated or strong control of supply network</i>
✓ Luxury fashion houses or those with a unique business model (eg Zara/Benetton/American Apparel)
✓ But as these companies have developed a greater international store network, more offshore sourcing has occurred
<i>Mid-market retailers with collaborative relationships</i>
✓ QR concepts applied offshore
✓ Development of international sourcing and distribution hubs
✓ Use of full package intermediaries (eg Li & Fung)
<i>Fast fashion retailers</i>
✓ Strong emphasis on sourcing from cheapest supplier
✓ Relationships can be short and variable
✓ Markets classified into short and long lead times
✓ For Western European retailers, a gradual shift from China to Vietnam, Turkey to Egypt and Romania to Moldova in terms of sourcing patterns

Bangladesh, in which over 1,100 people were killed (Lund-Thomsen and Lindgreen, 2013). Implementation of SCM initiatives in fashion supply chains must therefore enable retail buyers and suppliers to reconcile ethical issues alongside the commercial pressures of cost and lead time. We now consider the importance of CSR in international fashion supply networks.

CSR in international fashion supply chains

According to the World Business Council for Sustainable Development (WBCSD, 1999, p 3), CSR refers to a firm's obligations to the society in which it exists, namely:

the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large.

With increasing globalization and vertical disintegration of the supply chain in response to chronic downward price pressure, the fashion industry has become a focal point for the debate on sweatshops, child labour and worker exploitation (Smestad, 2009). The move from vertical integration to buyer-driven commodity chains or networks enables retailers to maintain economic control over their global supply chains with limited legal liability of the social impact of their operations (Sobczak, 2006; Gereffi *et al.*, 2005). Fashion retailers have often been accused of 'chasing cheap labour across the globe' while 'failing to pay their workers a living wage, using child labour, turning a blind eye to abuses of human rights, being complicit with repressive regimes in denying workers the right to join unions and failing to enforce minimum labour standards in the workplace' (Maitland, 1997, p 240). However, despite vertical disintegration, companies are increasingly held responsible by consumers and the wider media for the social performance of their suppliers, and ultimately for the entire supply chain (Andersen and Skøtt-Larsen, 2009). For example, in 2010 Nike was pressured to make good its Honduran subcontractors' failure to pay workers \$2 million in entitled severance benefits when their factories closed down, despite the fact that the subcontractors were independent supply chain entities (Greenhouse, 2010).

The application of CSR to the fashion supply chain requires retailers to consider the social and environmental impact of their business operations on stakeholders, such as workers and local communities. Environmental issues of pollution and the use of natural resources mainly relate to the textile pipeline, while social issues concern worker welfare and relate to the garment manufacturing function, due to its labour intensive nature. The social issues of CSR can be further broken down into three main areas: wages, working hours and working conditions (Sethi, 2003). Because of the lack of universal laws or regulations concerning the social aspects of CSR, these issues may be managed by means of private standards which are set at an individual company level, such as retailers' own ethical codes of conduct, or via multi-stakeholder initiatives such as the Ethical Trading Initiative (ETI) (Christopherson and Lillie, 2005; Tallontire, 2007).

Despite growing awareness of ethical issues in fashion supply chains, CSR implementation remains challenged by the context of the global fashion supply chain, in terms of commercial cost and lead time pressures, as well as the poor working conditions, weak regulatory compliance and corruption often encountered in the production contexts of less-developed countries (Schwartz and Tilling, 2009). Globalization has led to a situation whereby multinational corporations based in developed countries are able to apply local standards to their operations in less developed nations in order to maximize profits (Werther and Chandler, 2005). Invariably, host country regulatory standards on issues such as pollution, discrimination and wages appear inferior to accepted home country standards. Consequently, there is arguably an inherent conflict between the commercial pressures

of cost and lead time and the calls for improvements in worker welfare (Ruwanpura and Wrigley, 2011).

Three areas, in particular, have a negative effect on the ability of the supplier to uphold ethical requirements: lead time, flexibility and cost (Acona, 2004). With unpredictable demand and shortening product lifecycles, retail buyers reduce their risk of under- or over-buying by placing orders as close to the season as possible; however, short lead times and unrealistic delivery schedules increase the likelihood that suppliers may have to work overtime to complete orders in a timely fashion. Lack of advance commitment to orders and a requirement for supplier flexibility affects the supplier's ability to plan the demands on business resources and recruit the necessary permanent employees – instead necessitating the use of temporary workers who may also belong to vulnerable social groups such as economic migrants. Pressure to reduce garment cost could also force the supplier to lower wages and fail to pay overtime. Extended payment terms, which vary widely from 30 to 160 days, put added pressure on CMT suppliers that need to pay wages on time, and particularly on full package suppliers that must also pay for fabric and trims in advance. For example, in 2013, UK fashion retailer, Monsoon Accessorize requested a 4 per cent retrospective discount from all suppliers, as well as an increase in payment terms from 60 to 90 days (Hurley, 2013). Similarly, Laura Ashley requested a 10 per cent discount on cost price from suppliers with immediate effect, including on orders already placed (Cookson, 2013). Given these competing demands, Pickles *et al* (2006) noted that as order volumes and contract manufacturing prices declined in Western Slovakia, compliance with codes of conduct became more tenuous for suppliers. Such conflict between managing commercial requirements and ethical demands was neatly summarized by a factory manager of an Indian Walmart supplier in Hearson's (2009, p 7) study: 'Of course Walmart has many compliance standards. If we try to implement all of them, we can sit at home. No production will happen... To ask us to complete production with a code of conduct is one thing and to implement it is another thing.'

The rise of complex global subcontracting relationships results in reduced visibility and control of ethical issues in the fashion supply chain. Despite the development of ethical codes of conduct and audit procedures to guide socially responsible practices, these have questionable effectiveness, given the complexity of global fashion supply chains (Welford and Frost, 2006; Mares, 2010). As the competitive challenges of the sector give rise to retailer buying practices designed to minimize buying risk, reduce cost and increase frequency of shipments, there is a need to reconcile CSR implementation and concern for ethical issues with the competitive challenges of the fashion sector.

Research suggests that certain SCM initiatives may overcome the conflict between commercial demands and ethical requirements in fashion supply chains (Perry and Towers, 2013; Perry, 2011). Frenkel and Scott's (2002) empirical study of Asian athletic shoe manufacturers found that

collaborative trading relationships were dynamic and promoted joint learning and innovation, whereas with compliance-type relationships the setting of functional targets merely resulted in their achievement and maintenance, rather than a push for further improvement. Industrial upgrading from CMT to full package manufacture may lead to some degree of empowerment for the supplier, which may offer potential for improved employment opportunities and working conditions (Palpacuer and Parisotto, 2003), though the evidence for this assertion remains mixed (see Bernhardt, 2013).

The following section summarizes research conducted in Sri Lanka in 2009 by one of the authors (Perry, 2011), who collected qualitative case study data concerning Sri Lankan suppliers' relationships with Western fashion retailers. The following discussion serves to illustrate the impact of fashion supply chain characteristics on CSR implementation and how SCM initiatives may be implemented to reconcile CSR requirements with the commercial challenges of the sector.

CSR in garment manufacturing in Sri Lanka

A key global garment sourcing location (KSA, 2009), Sri Lanka has a reputation for high levels of social responsibility and compliance with norms of ethical sourcing (Ruwanpura and Wrigley, 2011; Loker, 2011) and today produces garments for many Western brands and retail groups, including Victoria's Secret, Liz Claiborne, Polo Ralph Lauren, Nike, Next, Gap and Marks & Spencer. It has gained a reputation among retail buyers for high quality, on-time deliveries and good customer service in key product categories of casualwear, sportswear and intimates (Tait, 2008). For retail buyers, Sri Lanka's competitive advantage is based on relatively low-cost labour, a literate labour force, high labour standards, investment-friendly government policies and strategic shipping lanes (Kelagama, 2005). Continuous reinvestment in backward integration has resulted in the development of a sophisticated apparel industry that has moved from contract manufacturing to higher value-added total supply chain solutions (Knutsen, 2004). The importance of speed, responsiveness and flexibility in the aftermath of quota removal explains the tendency for the vertical integration of Sri Lanka's larger suppliers: as orders are placed closer to the season, raw materials needed for production are close at hand to enable suppliers to coordinate upstream functions of fabric and accessory production.

Although Sri Lanka is unable to compete purely on cost with other Asian garment manufacturing nations, such as Bangladesh, Pakistan, Cambodia and Vietnam, it is able to provide a high quality full package service for mid to upper market retailers who put a premium on ethical compliance (Montlake, 2011; Loker, 2011; Ruwanpura, 2012). It is home to the world's first eco-manufacturing apparel plant and the only Asian apparel

manufacturing country that has signed up to 30 of the ILO Conventions prohibiting child and forced labour (Sri Lanka Apparel, nd). In 2006, the Sri Lankan textiles and garments industry body launched a campaign to brand the nation as the world's number one ethical garment sourcing destination in order to capitalize on its growing ethical reputation and garner more business from global fashion retailers. The 'Garments Without Guilt' initiative assured buyers that garments produced in Sri Lanka were made under ethical conditions. Under the scheme, factories are independently certified and monitored to confirm that they do not use child or forced labour and provide good working conditions for employees. Despite downward price pressure and the shift of garment production to lower labour cost countries, Sri Lanka has managed to carve out a unique position in the highly competitive global garment industry through industrial upgrading and a reputation for low-risk ethical garment manufacturing.

Empirical data from Perry's (2011) study of seven case study supplier companies, providing full package supply as well as contract manufacture to mid- to upper-market casualwear retailers, offers evidence of long-term, mutually beneficial retailer-supplier partnerships, characterized by commitment, trust and continual improvement. Sri Lankan garment suppliers have developed strong relationships with US and EU retailers over long time periods: trading relationships of 10–20 years were common. Although there was little evidence of formal commitments for future orders, there was an unwritten assumption of continuity based on the duration of the relationship and satisfactory past performance. Many of the case study companies were key suppliers to their retail buyers and thus formed part of a rationalized supply base. There was no evidence of traditional adversarial relationships characterized by short duration, an arm's length approach, competitive bidding, multiple sourcing or decisions based on short-term cost. Despite facing customer pressure for lower costs because of adverse market conditions in recent years, the larger full package suppliers experienced less downward price pressure than contract manufacturers. The main negative issue detected was an increase in buyer payment terms as a result of recent adverse market conditions – in some cases up to 90 days, subsequently affecting suppliers' cash flow. However, the size and increasing sophistication (industrial upgrading) of many of the suppliers resulted in some redistribution of the power imbalance, and enabled suppliers to negotiate retailers' terms to some extent rather than merely accepting them. For example, one full package supplier was able to refuse to continue supplying Zara once the retailer insisted on 90 days payment terms, as there was sufficient demand from other retail buyers due to its specialism in working with high-tech fabrics.

Increased collaboration and coordination between retail buyers and suppliers helped to reduce cost as well as improve agility by developing fashion product closer to demand: most large full package suppliers had dedicated product development centres, where buyers could come and

work alongside the production team to speed up the product development process and reduce lead time, without having a detrimental impact on worker welfare. By collaborating with retail buyers during product development or by integrating design and product development into the sourcing task, suppliers could reduce uncertainty as well as lead times, thereby reducing the likelihood of order changes or cancellations further down the line. Sourcing from full package, vertically integrated suppliers reduced complexity in the supply chain and thus improved visibility and control of social compliance issues. The size and sophistication of the larger suppliers, coupled with the fact that their competitive positioning in the marketplace was based on their ethical credentials, protected them to some extent (but not absolutely) from continued chronic downward price pressure.

The Sri Lankan industry was less prone to the vagaries of last minute changes and cancellations that have become common in offshore sourcing. Because Sri Lanka does not produce short-season fast fashion but rather seasonal fashion basic products, retail buyers can forecast more accurately and mitigate the problems of over or under-buying. However, one domestic contract manufacturer discussed frequent changes and cancellations to orders. As a subcontractor whose only added value was the provision of extra capacity, the supplier lacked competitive differentiation and was therefore easily manipulated by buyers.

In general, despite good trading relationships, there was a lack of written contracts of advance commitment from retail buyers that would have enabled manufacturers to better plan their future business. Nevertheless, factory managers appeared to have faith in the continuation of the relationship based on the length of the ongoing trading relationship. The duration of relationships and the added value services and volumes provided by the larger full package suppliers seemed to counteract the lack of written guarantees of future business. Some of the larger suppliers had also been dealing with many of their key buyers personally for 10 to 20 years which enabled suppliers to feel relatively secure in the knowledge that the trading relationship would continue. It also encouraged suppliers to share confidential information with buyers, such as costing data, without the threat of the retailer using the data opportunistically to drive prices down. Virtual integration also helped to overcome the problem of lack of written contracts from buyers and thus represented a commitment that enabled the supplier to plan and invest in the business. Trust in the trading relationships enabled both parties to collaborate when problems occurred without resorting to contractual remediation, thus reducing transaction costs.

This research focused on the mid-market fashion retail sector and the collaborative trading relationships associated with fashion basic products that are less time sensitive than short-season fast fashion products (see Figure 4.3). By offering fashion retailers a full package garment supply solution as well as low-risk sourcing due to its strengths in ethical and eco-manufacturing of garments, Sri Lanka has achieved a sustainable point

of differentiation in a competitive marketplace. It cannot compete on price with other lower labour cost countries, nor does it have the ability to produce fast fashion with small batches and frequent style changes.

Conclusion

The trend for timely fashion has resulted in a reconstruction of international supply chains as high street retailers have had to adapt to the simultaneous challenges of downward price pressure, higher product variety and shorter product lifecycles. The shift to offshore sourcing has been a key feature of fashion supply chains more widely over the last 20 years as Western based retailers seek to reduce costs but maintain flexibility in their influential role within retail buyer-driven supply chains.

Many of the larger Sri Lankan suppliers reviewed in Perry's (2011) empirical research are well positioned to compete for this business along with full package intermediaries such as Li & Fung. With increasing global scrutiny of ethical standards in globally dispersed supply chains, sourcing from trusted full package suppliers in low-risk locations helps to avoid ethical misconduct and the risk of negative publicity for brands and retailers. As noted by ex-VF Corporation senior executive Jeff Streader: 'Sri Lankans aren't the cheapest guys. It's for people who are trying to differentiate their product' (cited in Montlake, 2011).

It may be argued that a lack of formal written contracts is consistent with transaction cost economics and trust theory, which is concerned with the effect of trust in reducing opportunistic behaviour between trading partners: as trust develops, the risk of opportunism is mitigated and the cost of transacting is reduced, since trust removes the need for detailed legal contracts as a means of governance (Williamson, 1993; Bidault and Jarillo, 1997). With the shift from vertical integration to networks of independent supply chain entities in the fashion industry, the long-term orientation and the drive to achieve shared goals enables supply chain networks to function as closely and seamlessly as vertically integrated firms while also avoiding the disadvantages of capital plant tie-up, plant obsolescence and organizational inflexibility. It enables the network to overcome external firm-to-firm boundaries and become a service-driven network with supply as the shared goal (Cox, 1996). The close and trusting relationships necessary to underpin effective virtual supply chain integration are also supportive of CSR implementation.

Implementing CSR initiatives in globally dispersed fashion supply chains can be justified through the protection of brand reputation and ensuring supplier business sustainability and capability enhancement, which can lead to a reduction of risk in sourcing. By adopting a SCM approach to trading relationships, fashion retailers may reap the potential of improved supply chain performance and reduce compromises to CSR at a factory level. By

building closer relationships with fewer suppliers, sharing information and integrating pre-production activities such as product design and development, fashion retailers can reduce time-to-market without compromising worker welfare in factories. Adopting SCM principles promotes sustainability in supply chains and helps to maintain ethical standards by overcoming the negative effects of retail buying practices. It also progresses supplier CSR performance beyond that which is achievable via a coercive, compliance-based model: in particular, the principles of shared goals and collaborative ways of working move the focus onto the long-term and a partnership way of working as distinct from a short-term adversarial approach that tends to breed distrust. This encourages suppliers to be innovative and take ownership of CSR, driving it through their businesses to cascade best practice throughout the supply chain for the benefit of all supply chain partners.

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DOI:10.1080/00472336.00472013.00801166

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The footwear supply chain: the case of Schuh

John Fernie and Colin Temple

Introduction

In *Retail Distribution Management*, the forerunner to the current editions of this book, Philip Hammersley (1990) wrote a chapter on supply chain management in footwear retailing. In many ways the challenges facing his company, the British Shoe Corporation (BSC), were similar to today. He comments upon a flat market, escalating retailing costs and the need to have a more integrated supply chain to reduce lead times from date of order to the receipt of goods. While Hammersley acknowledged the international nature of sourcing in that his company traded with hundreds of suppliers from over 40 countries, this was a time when the UK had a large manufacturing base centred around Northampton and Leicester, where BSC was based. Indeed, his conclusion to the chapter was that Quick Response (along the lines of Kurt Salmon Associates' recommendations for the US textile industry) should provide an opportunity for domestic manufacturers because 'it takes at least 13 weeks to obtain shoes from Taiwan or Indonesia and at best three or four weeks from a factory in Leicester' (p 205).

The rest is history. BSC would cease to exist and break up its shoe empire between 1996 and 1998 in the face of increased competition from clothing chains, department stores and more fashionable shoe specialists. Similar to the trends identified in the previous chapter in the clothing market, the traditional middle market began to suffer from the rise of fast fashion retailers at one end of the spectrum and strong branded fashion shoes at

the middle to luxury end of the market. This change was quick and dramatic in that BSC dominated the British high street in the 1980s with around 2,500 stores accounting for up to 25 per cent of the market. It traded under formats such as Freeman Hardy Willis, Mansfield, Trueform and Dolcis. The problem with BSC was a lack of differentiation between their range of formats and a blandness of styles that caused commentators of the time to state that BSC treated shoes as a commodity while their competitors offered fashionable shoe brands.

This trend has continued to the present time with a strongly segmented market place from high end, celebrity endorsed brands such as Jimmy Choo and Christian Louboutin to the aggressive expansion of New Look and Primark at the fast fashion end of the market. In between we have sports brands such as Nike and Adidas and the specialist branded chains such as Kurt Geiger, Office and our case study company Schuh.

Prior to discussing Schuh it is appropriate to discuss the complexities of the footwear supply chain. While much has been written about the textile supply chain, research on the footwear sector is limited and mainly undertaken by Italian academics in view of the relative viability of the Italian footwear industry compared with many other Western economies.

Offshore sourcing and outsourcing

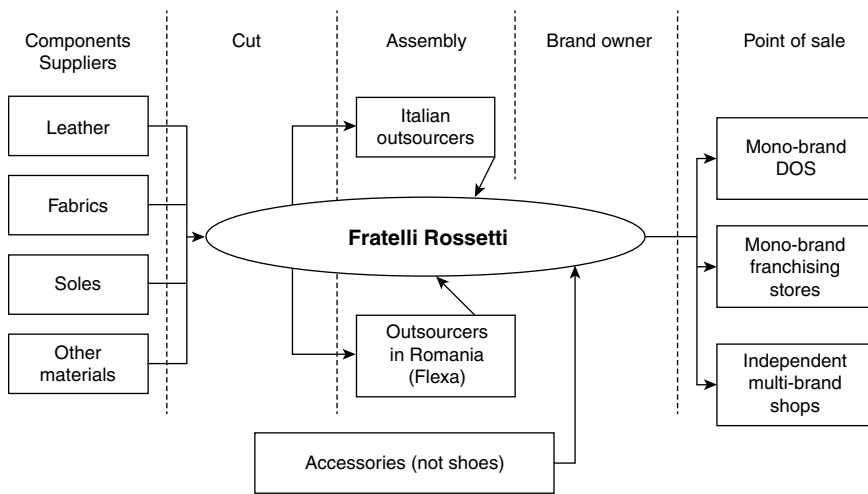
In many ways the trends in the footwear supply chain mirror those of the clothing supply chain discussed in the previous chapter. However, the footwear supply chain is more complex and more labour intensive than in the clothing sector. Indeed, the initial drivers of change in the footwear sector came from the main sports brands, notably Nike, Reebok and Adidas. These companies adopted the design, sourcing and distribution model illustrated in Figure 4.1. Taylor (2009) states that these companies are specifiers in that they specify design, do not own manufacturing facilities but subcontract to a range of manufacturers in low labour cost areas. In his case study of Texon, a UK company that supplies materials such as linings, insoles and sole-mouldings to Adidas factories in south-east Asia, he discusses how Texon can improve its supply chain performance to supplying these factories in China, Indonesia, Vietnam and Indonesia. In total Adidas has 42 independent manufacturing companies producing its brand.

Although many Western countries have a legacy of shoe manufacturing, most manufacturers of conventional footwear moved production offshore by the 1990s. Ironically the well-known UK manufacturer, Clarks, began to close its UK factories and source shoes from Portugal (and subsequently India) at a time when it was opening a Factory Outlet centre at its original site in Street, Somerset. In the United Kingdom there has been a substantial

contraction of the footwear sector over the last 30 years with only a small high quality, niche manufacturing sector remaining. However, this decline is not uniform across the EU or other parts of the OECD. Like the United Kingdom, the United States and Germany footwear industry has experienced substantial shifts to offshore sourcing and outsourcing of production compared with Italy and Portugal where production and exports have increased. Fornasiero *et al* (2009) note that two thirds of all EU production comes from Italy, Spain and Portugal, with Italy dominating with 50 per cent of production, predominantly of classic, high quality shoes. Indeed, Brenton *et al* (2000) noted that in those countries, especially Italy, import penetration has gathered pace over the decades but higher export intensities have also been maintained. This would appear to suggest that Italy has retained a high quality viable footwear industry. Brenton *et al* (2000) further argue that the relative success of Italy can be attributed to a move to flexible production and the clustering of a well-developed network of producers and their suppliers within specialized industrial districts such as Brenta and Marche; a point endorsed by Fornasiero *et al* (2009).

It can therefore be argued that these areas of specialized flexible production, also evident in other countries such as China (Huang *et al*, 2008), are akin to the network organizations prevalent in the business models of clothing retailers such as Zara, Benetton and the Japanese bridge fashion companies (Azuma, 2002). In both markets a strong emphasis is placed on the outsourcing of labour-intensive elements of production.

In Italy, the case of Fratelli Rossetti illustrates how a luxury shoe manufacturer continues to have a strongly vertically integrated supply chain for its core heritage product (men's shoes) but has outsourced production of other elements of its developing portfolio (Brun and Castelli, 2008). This is similar to luxury clothing brands that have retained production of their 'heritage' brand (for example Burberry and the trench coat) but outsourced and invariably offshore sourced other brands in its portfolio. The main difference with Fratelli Rossetti is that on extending into women's shoes, the company decided to outsource to manufacturers in the same Italian industrial district. This allowed the company to control the design, material selection and distribution but outsource the manufacturing phases thereby retaining the 'Made in Italy' label. When the company further expanded into a sports diffusion brand (Flexa), country of origin was of less concern so these shoes were designed in Italy but manufactured in Romania. As with other fashion companies, Fratelli Rossetti designs and distributes leather accessories with production outsourced to specialist companies. Figure 5.1 illustrates the supply chain configuration of Fratelli Rossetti and also shows the retail channels through which the company's products are sold. It is worth noting that the DOS mono brand outlets are company owned and staff are trained to communicate the brand image by selling the full product range.

FIGURE 5.1 Supply chain configuration of Fratelli Rossetti

SOURCE: Brun and Castelli, 2008

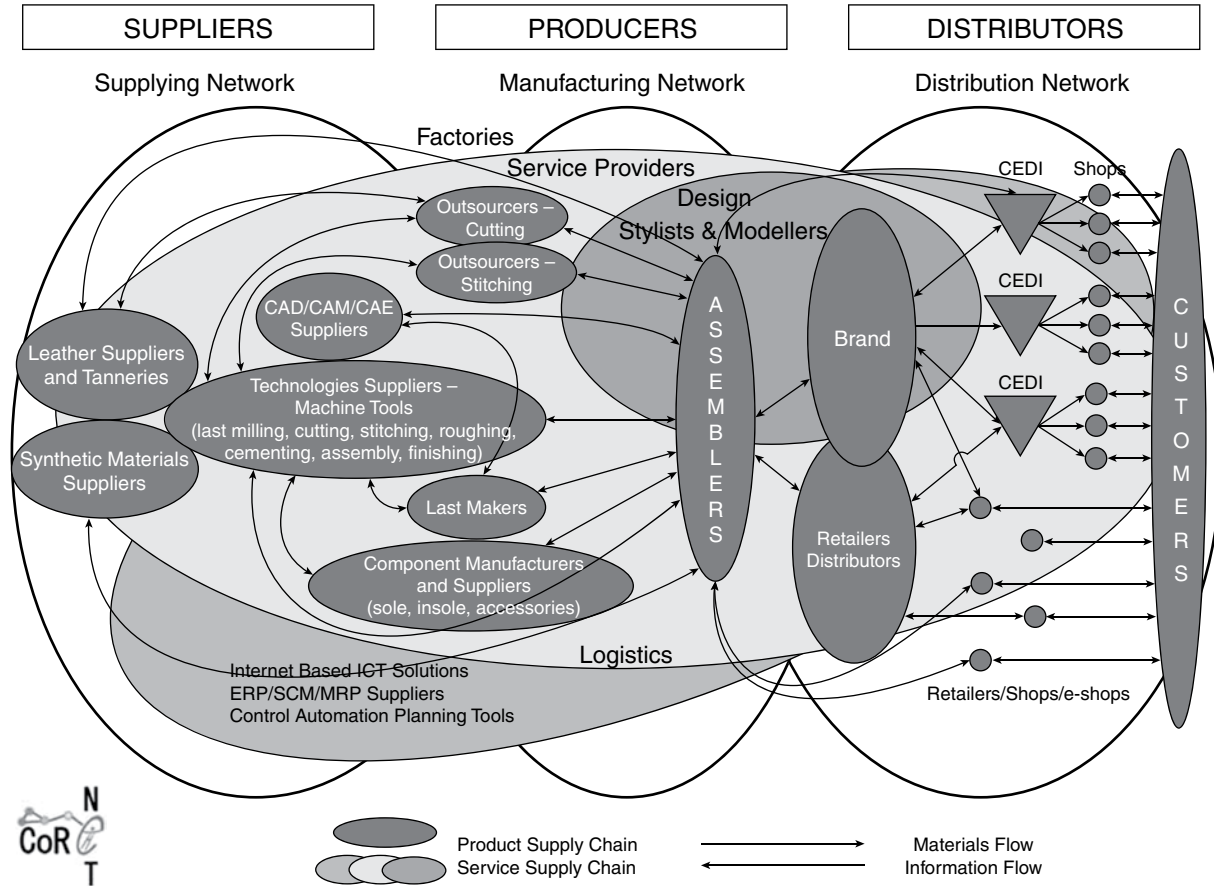
The complexity of the footwear supply chain

Although we have noted the similarities in the clothing and footwear supply chains, the main difference is the much longer lead times evident in the footwear supply chain: hence, academic research on the topic has focused on how to reduce time to market. Franchini *et al* (2011) provides a general overview of the configuration of the footwear supply chain (see Figure 5.2). They show how the process is initiated with the design of the shoe collection and the engineering of the component parts; a prototype is created, samples provided and orders taken to enable a production plan to be developed. It is the collaboration between stylists (designers) and suppliers that is the key to efficient production; however, many actors are involved in the supply network as functions are outsourced and special services, such as treatments to leather, are provided.

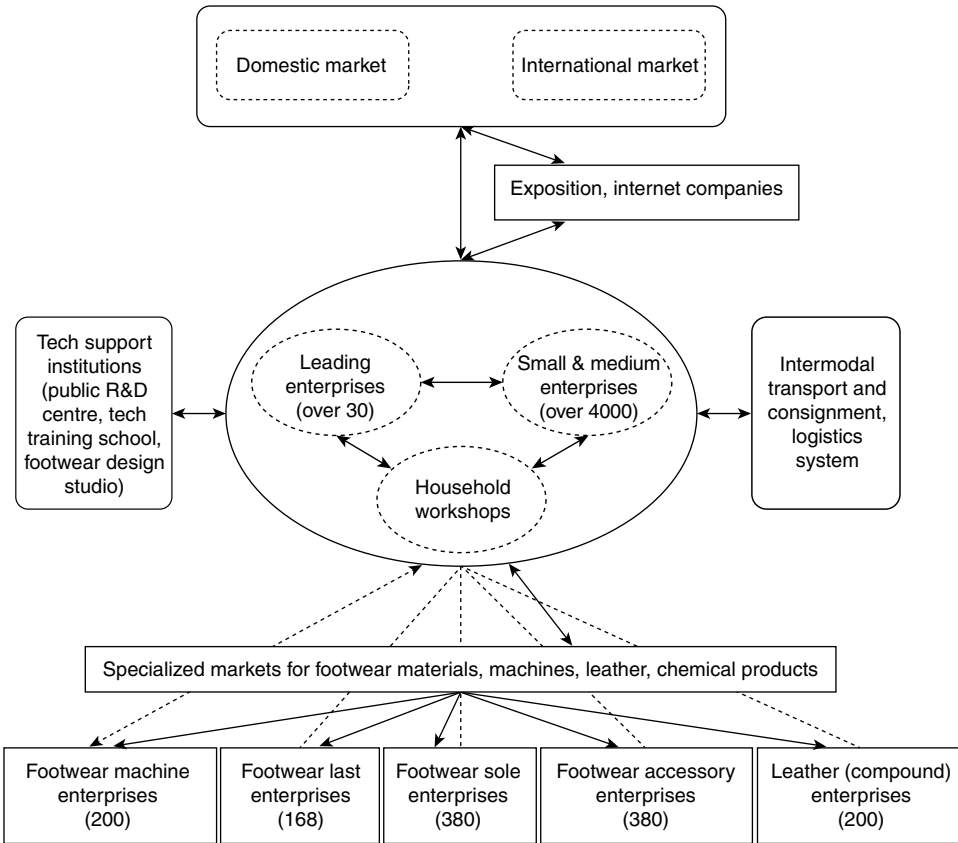
Huang *et al* (2008) illustrate the large number of intermediary products required in the Wenzhou footwear cluster in China (see Figure 5.3).

Table 5.1 identifies seven categories and over 20 varieties of intermediary products and yet the authors comment that further divisions of labour are required to disaggregate the production process into smaller steps, for example the assembling of small metal accessories such as buckles.

FIGURE 5.2 Fashion footwear supply network



SOURCE: Franchini et al, 2011

FIGURE 5.3 The structure of the Wenzhou footwear cluster

SOURCE: Huang *et al*, 2008

Fornasiero *et al* (2009) comment that the complexity of shoe production is not so much the product itself but the many models and variants that need to be designed and manufactured. For example, they claim that each firm produces 300–400 models per season with a total number of items of between 4,500 and 8,000 each season. This point is endorsed by Bertolini *et al* (2007) in their work on north eastern Italian footwear companies where they show that a collection comprises 11 different models on average and each model includes 16 variants; a total of 176 items in a collection. These authors used business process re-engineering techniques to evaluate lead times and make recommendations on how to reduce time to market. The thrust of their work was to identify in a series of Gantt charts the processes involved from the creation of collections to final delivery of the shoes. They classified the processes as value added and non-value added.

As a result of this analysis, it emerged that 210 days were required to sell the new collection to customers; creating new collections took 85 days;

TABLE 5.1 Intermediary products for shoes

Assortments	Intermediary products
Upper of footwear	Leather, PV leather, PVC leather, etc.
Sole of footwear	Outsole, mid-sole, insole, heel, sock lining, heel pad, etc.
Lining of footwear	Fore-lining, back-lining, sponge, cloth material, foam, etc.
Materials of footwear	Filament, cement (rubber cement, neoprene), crepe, etc.
Matching products	Last, footwear horn, cotton flannel for footwear-polishing, brush, etc.
Accessories and ornamental materials	Footwear buckle, slide fastener, lace, edging, elastic band, etc.
Packing materials	Box/carton, brand, tag, label ticket, tissue paper, drying agent, etc.

SOURCE: Huang *et al*, 2008

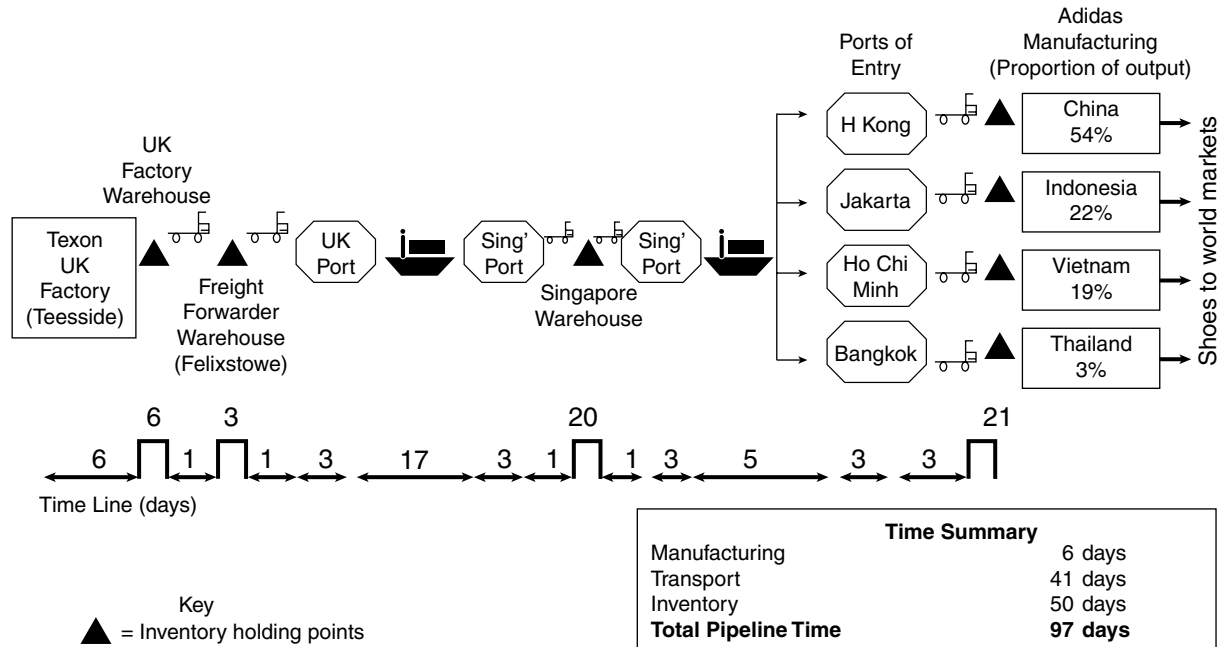
order collecting 30 days; raw materials procurement 85 days and manufacturing and distribution 10 days. Bertolini *et al* (2007) maintain that there is much time overlap between activities, primarily in new collections because planning is already underway for the next season before the customer has all of the stock for the current season. The authors argue that order collecting and some procurement activities are non-value added and can be streamlined with the implementation of ICT tools. The net result could be a reduction of lead time to 144 days. Fornasiero *et al* (2009) concur with these views on how to reduce lead times. Despite the clustering of production in industrial districts of northern Italy, they argue that greater integration in production planning is required with greater standardization of some shoe components and better communication protocols between supply chain partners. Furthermore, too much work in progress occurs because of a lack of synchronization of components delivery for shoe assembly. They argue that planning should be coordinated around the delivery of the uppers of the shoe as it has the longest delivery time, thereby heels, soles, lasts, etc should not be ‘pushed’ to production until necessary to reduce waiting time before assembly.

All the examples cited above used lean supply principles and supply chain pipeline mapping techniques in footwear ‘clusters’ where most suppliers were in close proximity to each other. In the case of Texon referred to earlier in the chapter, this British supplier of linings and sole components to Adidas was manufacturing and supplying product thousands of miles away. This case reveals the lengthy supply chain pipeline that the company operated prior to addressing the situation through value stream mapping. Taylor (2009) discusses the product flow map (Figure 5.4) prior to undertaking the research. The product, T26, was manufactured at Texon’s Teesside factory according to erratic demand forecasts. It was then stored at the factory warehouse, transported to a freight company’s warehouse, moved to port, consolidated with other products and shipped to Singapore. There the stock was stored at a local warehouse prior to onward customs clearance and delivery by sea to China, Vietnam, Indonesia and Thailand. Then the manufacturers would pick up the product at the port for distribution to their factories. The overall average pipeline time was 97 days with transport accounting for 41 days and inventory levels at around 50 days.

On analysing not only the product flows but information flows, management control systems and responsibilities for documentation, it became clear that there was too much stock in the system and it was often too far from the customer necessitating emergency shipments to customers by airfreight. Furthermore, too much time in the pipeline was of a non-value added nature, adding cost but little value in terms of customer service. Although one half of the output was destined for China, product was transhipped via Singapore. It materialized that this was a historical legacy in that Singapore was the original regional hub for Asia but the location had not been re-evaluated as the business had grown and sourcing had moved more towards China. An evaluation of internal forecasting and management systems revealed that too many individuals and organizations were involved in forecasting and the processes of coordinating the whole supply chain.

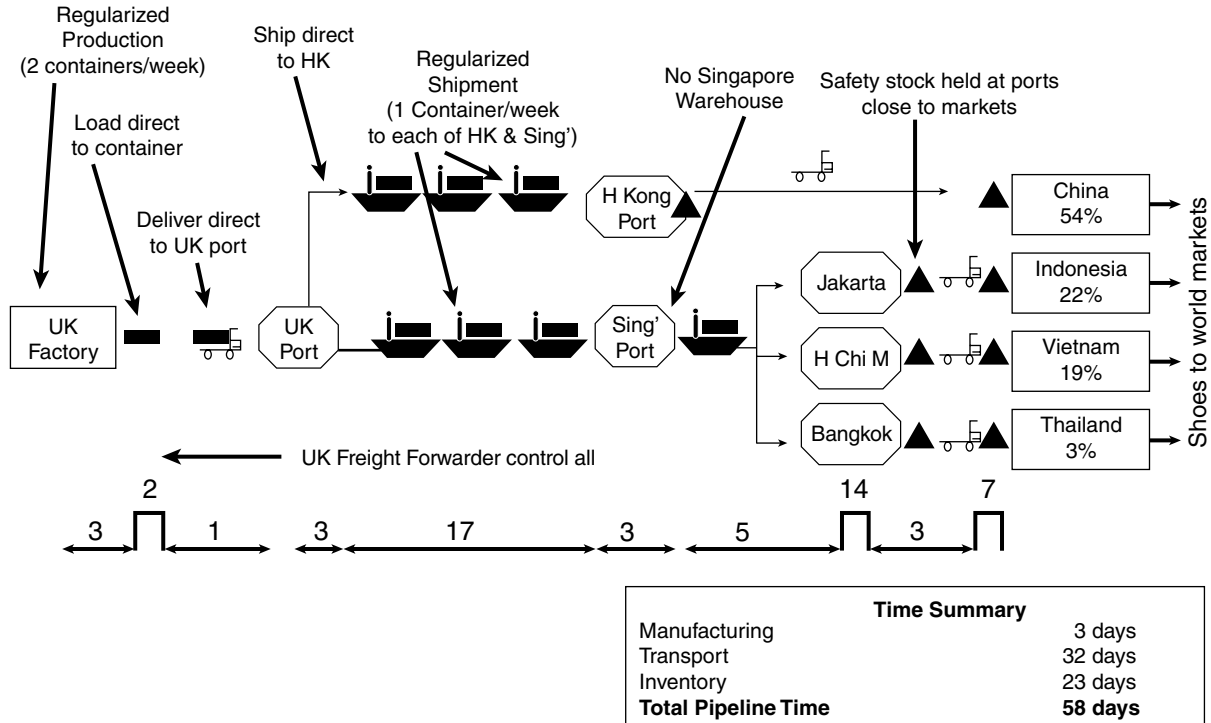
Figure 5.5 shows the changes that were advocated by Taylor (2009) to address these problems of excessive stockholding and long lead times. By streamlining the forecasting process to that of Adidas’ HQ it enabled production to be consistent in volume thereby allowing two container loads to be transported direct to port. One shipment was destined for Hong Kong and the other to Singapore where the product was cross docked for onward transshipment to non Chinese markets. Safety stocks were held at local ports of entry and were amended accordingly as customers began to adjust to a more consistent flow of product nearer to the point of manufacture. The net result of these changes was to reduce or eliminate non-value added steps in the logistics pipeline (the warehousing and transportation in the United Kingdom and Singapore). As can be seen from Figure 5.5, total pipeline time was reduced to 58 days, stockholding to 23 days and transport to 32 days.

FIGURE 5.4 Current state map: product flow



SOURCE: Taylor, 2009

FIGURE 5.5 Future state map



SOURCE: Taylor, 2009

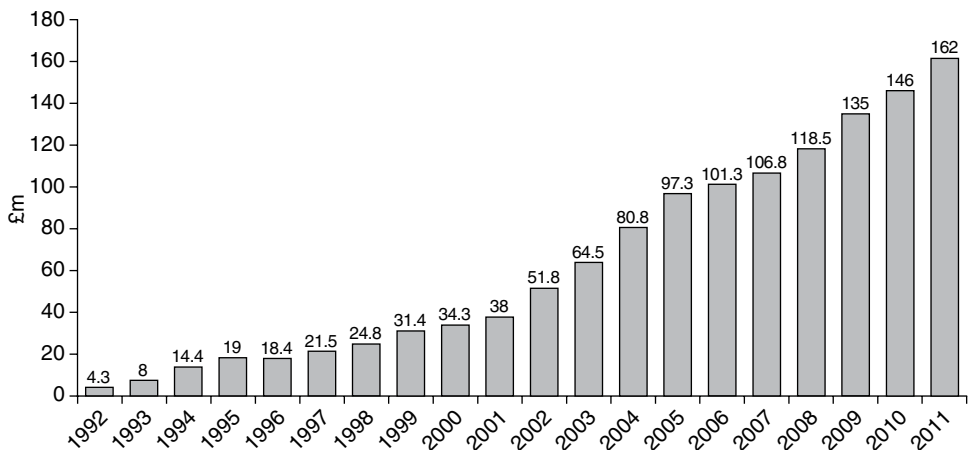
The case of Schuh

Much of the discussion has centred around the lengthy lead times to manufacture a shoe in view of the intricate planning required to bring in component parts for final assembly. Although Italian vertically integrated companies have relatively short lead times to delivery shoes to their stores, most retailers selling shoes, whether specialists, department stores, fast fashion outlets or online businesses, source product mainly from Asia and then have to deliver shoes to a network of stores or to customers online. This case highlights the success of one British company that was taken over by Genesco, a US listed footwear company, in June 2011. Figure 5.6 shows the impressive sales growth of the company. Not only has it doubled sales from around £81 million in 2005 to £162 million in 2011, it has increased gross and net margins during the recession when many of its competitors have gone out of business. Around 15 per cent of sales come from the online business.

Schuh is a relatively new company. Founded in 1981 by Sandy Alexander in Edinburgh it was sold to a department store group, Goldbergs, which subsequently went out of business in 1990 to then be bought back by the management team. In March 2012 it traded from 67 standalone stores in the United Kingdom (plus 15 concessions in the Republic chain) and a further eight stores in the Republic of Ireland.

Schuh is a volume high street fashion retailer appealing to a mass market although the core demographic group is 15–30 years old seeking key fashion brands such as UGG, Converse, Toms, Vans and Timberland. The average ticket price of £50 is more about affordable escapism than individual designer pieces. Schuh buyers offer continuity of core product

FIGURE 5.6 Sales of Schuh, 1992–2011



SOURCE: Company information

dressed with inspirational looks. Profit comes from the ability to back the best-sellers while still giving retail theatre. Managing the supply chain is how it all happens.

The hub of the operation is at Schuh's headquarters at Livingston, near Edinburgh, where the distribution centre is also located. Stock from suppliers is managed by Schuh's own proprietary warehouse management system (Shark) and stores then receive deliveries six days per week by 10am each morning. While Schuh has maintained strong control over its warehouse operations it contracts out the delivery to stores and online customers to parcel carriers. Schuh's efficient distribution system has given it the highest display densities of any of the main UK footwear retailers. It has at least 30 per cent more options per sq ft than its peer group.

Despite having a unique concept, Schuh is a multi-branded footwear retailer selling brands that by and large are available at competitors' stores. Schuh does not have the price elasticity enjoyed by wholly own-branded retailers. This means that mark-downs need to be tightly managed or, to put it another way, the buyers must buy good products.

On average, Schuh will carry over 90 brands overlaid with its own brand offering. Schuh aspire to be an 'authority' on fashion footwear. The buyers edit massive ranges from each brand down to a credible offering. In effect, if Schuh stock it, it is fashionable.

This shift in manufacturing base to offshore sourcing resulted in Schuh adjusting its private label business from a peak of 40 per cent of turnover to nearer 15 per cent today. Consequences of this shift have been a dramatic reduction in buying margins. Private label margins are at least 10 per cent higher than branded margins. Despite reduced intake margins, Schuh has managed to increase its operating margins by increasing stock turn, better managing distressed stock and leveraging technology/systems to be more efficient.

Stock turn

Increasing stock turn has the advantage of tying up less capital and less stock requires less stockroom space. In the early 2000s, Schuh worked with about 22 weeks forward stock cover, or a stock turn of 2.36 (52 weeks divided by 22 weeks cover); it now works on 12.5 weeks cover, or a stock turn of 4.16.

To explain how this has been achieved, private label and branded footwear supply chains have to be assessed separately. Private label footwear is sourced at a factory where an item is created by a Schuh designer. The factory manufacturers the shoes and Schuh arranges uplift from the factory to its Livingston warehouse from where it is then distributed to stores.

Schuh uses the Far East for about 30 per cent of private label production and Europe, mainly Spain, for the rest. The East is cheaper but harder to manage; longer lead times (shoes are on the water for up to six weeks) require larger quantities to be ordered. Agents are used to manage the supply

base in the East. Spain is more expensive but has much shorter lead times and requires smaller orders. Although agents are still used, it is much easier to quickly sort out any issues that arise compared with dealing in China. This blend of the Far East and Europe improves stock turn with large orders from the East for staple product complementing small orders from Europe on riskier, fast fashion items.

Branded suppliers deliver direct to Schuh. Most brands are sourced from the Far East and have 6–9 month lead times from Schuh ordering stock to it being delivered. Large orders are broken down and staggered so that enough stock is delivered for an initial allocation with a degree of back-up stock, followed by repeat orders if and when the sales come. Schuh tries to encourage suppliers to carry stock so that it can be called off from them, although this shifts the risk from the retailer to the brand. However, any relationship will only work if it works for both parties and Schuh's relationship with suppliers is vital. Little things like paying on time, honouring orders and solving problems together will help Schuh become the retailer of choice for the brands.

Managing distressed stock

All retailers buy the wrong stock and even when they buy the right stock they are very often left with odd sizes or tarnished items. Optimizing the terminal price of this stock has been a big factor in increasing stock turn for Schuh. It has a simple merchandise philosophy of 'Best Store Best Stock', meaning that whichever store sells a line of shoes best will get the best stock, regardless of the size of the store. Schuh does not grade stores or group stores in any fashion and stores are not range planned.

Store inventory is controlled by managing display slots and stockroom slots. Typically, 30 per cent more lines are carried by the wider business than the biggest store can display. No store is able to carry the entire range, the exception being Schuh online. When first open, a new store will get a wide, thinly backed range that will fill all the display slots on the sales floor. As the store trades, lines that sell will be boosted and slow moving lines will be removed. A rolling open to buy policy means that new lines are introduced every week. To make space for these new lines, each store returns stock three times a week. The slow moving stock is taken out to make room for faster selling or new lines. These removed lines are sent to stores that perform better on that specific item, ie Best Store Best Stock.

By doing this, a new store range will tailor itself to local demand. All Schuh store ranges are a by-product of local demand, albeit best-selling lines tend to be in all locations.

Distressed stock is managed in a Best Store Best Stock way. Items often sell much better in one location than in others. Consolidating sale stock to performing stores means less mark downs and faster stock turn.

The internet is a dynamic force in selling sale stock. It has a wider audience than a traditional store could ever achieve and a bargain culture mindset has resulted in schuh.co.uk becoming a highly efficient vehicle for distressed stock. The ability to populate the website with all stock, including store stock is vital. eBay has its place in maximizing the terminal price of sale stock. Auctions and fixed prices on eBay allow for the micro-management of stock. As well as aiding stock turn, it keeps the retail outlets clean of fragmented product.

Technology/systems

Building a bespoke system has enabled Schuh to automate 70 per cent of allocation/replenishment/consolidation decisions. The introduction of a sorting/stock movement system led to a 30 per cent increase in warehouse productivity in two years with the capital costs being paid for in that time in terms of these cost savings. This gives buyers and merchandisers more time to work with the supply base on buying/phasing stock. It also allows a common stock base to be used for all channels: stores, e-commerce and customer orders.

Levering technology to help business processes has proven effective. Kiosks to process customer orders in store, texting stores to reserve stock, shipping internet sales from stores all help to improve customer service, leading to more sales. The customer is increasingly dictating the nature of the Schuh supply chain. The customer can reserve online pick up in store, buy online pick up in store, buy online for a timed delivery, have delivery to a local 24/7 shop (collect+), have 90 minute delivery, or have free delivery and free returns. Understanding what the customer wants and testing the commercial viability to offer these demands will set the agenda for Schuh.

All retailers – footwear, clothing or otherwise – are faced with new ways to shop, new mobile technology, new social networks and rising prices at a time when spending is contracting. The ability to have an efficient supply chain is vital not only to prosper but also to survive.

Conclusion

The Schuh case illustrates how a company can achieve competitive advantage through the efficient buying and distribution of footwear brands to an increasingly sophisticated consumer who is willing to buy through a variety of marketing channels. Schuh has provided an online offering since 2001, defying sceptics who did not think that footwear could be sold without trying on a pair of shoes in a store. In some cases customers do come to a store, know which product they want but may not find the right colour. To avoid a potential loss of sale the company can provide next-day delivery to the customer's home of the required item. This multi-channel approach

can only be achieved through the distribution network discussed above. Furthermore, Schuh was one of the first fashion companies to sell 'distressed stock' on eBay thereby freeing scarce store space of old stock to make way for new lines.

The case also highlighted how product is sourced offshore thereby partly contributing to the long lead times from ordering stock to receiving deliveries. The earlier part of the chapter highlighted how other factors contributed to footwear having such lengthy lead times. The complexity in designing a range of models, the integration of a dispersed range of materials and components and the intricacies of final assembly mean that lead times are measured in months rather than the days cited in discussions of lead times in the clothing supply chain. Not surprisingly much of the research cited here focused upon how a range of value chain mapping techniques could be used to reduce lead times at the pre-production stage of the footwear supply chain.

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Supply chain strategy in the fashion and luxury industry

Alessandro Brun and Cecilia Castelli

Introduction

Quite often, when referring to the consumer markets of such commodities as textile and apparels, leather goods and accessories, the concept of ‘luxury’ is often confused with that of ‘fashion’. Indeed, while the luxury industry knew exceptional growth in the last decades (with few exceptions of steady situations within the recent financial and economic crisis), fashion companies in general have been facing quite a challenging period, mainly because of the threats deriving from the continuous entrance of new competitors in a market where immaterial capabilities are the key for success. However, many academics and practitioners refer to the ‘fashion and luxury market’, because fashion and luxury companies often share the same management challenges. One of these regards the definition of the most appropriate strategy for managing the supply chain.

For this reason, the present chapter is dedicated to the basic principles of supply chain strategy. The chapter is structured as follows: after discussing the relevance of supply chain management (SCM) in luxury and fashion, the typical structure of both the inbound and the outbound supply chain are described. The typical approach of fashion and luxury companies is discussed, with examples of noteworthy configurations taken from shoe, leather bags and underwear sectors. The theory of the ‘segmentation tree’, advocating a portfolio approach for supply chain strategy, is then presented and discussed.

The relevance of supply chain management in luxury and fashion

In the fashion sector the competition is fierce, especially on the retail side (Newman and Cullen, 2002). The soaring of scale and bargaining power of major retail buyers in the market, the advent of own brands retail networks, the increasing globalization of sourcing and supply chain decisions are just some of the issues that have contributed to this complexity. Indeed consumers are no more focused only on product characteristics; their purchasing attitude is everyday more influenced by the 'complete shopping experience' provided at the point of sale (Porter and Claycomb, 1997; Danziger, 2006), ie the contact point between the consumer and the supply chain. Furthermore, increasing brand awareness sets the requirements for aligning operations along the supply chain towards the personality of the brand and its positioning (Moore and Birtwistle, 2004).

Hence, fashion markets are every day more synonymous with rapid change and, as a result, commercial success or failure is largely determined by the organization's flexibility and responsiveness (Christopher *et al*, 2004). For the above reasons, researchers in the area of fashion started to focus their attention on the domain of SCM (Harrison *et al*, 1999; Lowson *et al*, 1999; Christopher and Towill, 2002; Bruce *et al*, 2004; Christopher *et al*, 2004). Indeed the road towards competitiveness should go far beyond the management of a single company or even a supply chain, but passes through the management of the whole supply network ('today competes the supply chain, not the company', Christopher, 2000) and sustainable competitive advantages through low cost or high differentiation can be achieved only by managing the interconnections among the various organizations within a large network. At the same time, increased customer and market orientation is needed (Schnetzler *et al*, 2007).

SCM indeed proved paramount for firms to remain competitive, in a context where most activities are outsourced and the interaction of multiple actors is critical to ensure the delivery of products to the customer (eg Stevens, 1989). The concept of supply chain strategy has been developed as an evolution of the consolidated framework of manufacturing and operations strategy proposed by Skinner (1969) and Hayes and Wheelwright (1985): the operations strategy framework (in terms of competitive priorities, structure and infrastructure) can be extended to the supply chain (Harland *et al*, 1999). In particular, to thrive in today's highly competitive marketplace, supply chain strategy should aim at matching product characteristics and customer requirements (Aitken *et al*, 2003; Li and O'Brien, 2001; Demeter *et al*, 2006). Other contributions expressed the need to focus supply chain strategy and align it towards the critical success factors (CSF) of the considered product/market, ie those features in terms of product or service design that allow a firm to succeed into a specific market segment (customers select the firm's product and not the competitors' ones because of those specific

features; Rockart and Van Bullen, 1986). Product features indeed influence supply chain configuration and management choices (Brun *et al*, 2008) and should be taken into account in order to capture end users' needs and maximize the value in their perspective (Al-Mudimigh *et al*, 2004).

Throughout the last two decades of the 20th century the fashion business appeared to emphasize the view that 'marketing is everything' (McKenna, 1991): companies stressed especially the aspects of building and promoting their brands. As a consequence, both academic authors and market experts refer to 'fashion (or luxury) brands' rather than to 'fashion (or luxury) products', to the point that the brand component is not separable from the concept of fashionableness.

A brand is not a product, or a collection of products. A brand is the total sum of everything a company does, which means creating a larger context or an identity in the consumer's mind. The brand is the milestone on which such an identity (often translated into a lifestyle concept) can be proposed to consumers.

Brand power could be so important that, often, achieving a good brand reputation is enough for claiming a luxury positioning. According to Kotler (2003) 'if you are not a brand you are a commodity. Then prices are everything and the low cost producers are the only winner'. Currently brands are so relevant that – in the logic of 'brand extension' – it's by far more likely for a commodity or a relatively inexpensive product (eg steel jewellery) to become 'luxury' in the consumer's mind when it carries a luxury brand's name, rather than an unknown brand to achieve a luxury reputation thanks to the preciousness or exclusivity of the material good: eg Cartier transferred its brand from jewellery to perfumes and accessories, Louis Vuitton expanded from handbags to clothing. According to Aaker (1991), for fashion labels, according to their positioning, brand can become the reason for justifying a premium price due to its reputation and to the fact that it provides psychological satisfaction to customers (Davies, 1992). Especially in the fashion side of the luxury market, 'value for the end user' can be expressed everyday not only in terms of tangible characteristics of the product: often the pre-eminent aspects are the emotional and intangible contents conveyed by the brand and expressed through a 'complete shopping experience' (Danziger, 2006).

Hence, success often depends on the alignment between substance (material goods) and the image perceived by customers, ie brand positioning (Moore and Birtwistle, 2004; Girod, 2005). A major source of competitive advantage is the degree to which organizations are able to orient their practices towards building the brand and sustaining it over time (Bridson and Evans, 2004). Many examples are available, witnessing the achievement of good results thanks to a business model aligned towards the brand's value. For instance, Gucci's maximization of internal controls with respect to product sourcing, brand communications and distribution was a way to achieve successful re-positioning as a luxury brand (Moore and Fernie, 2004).

In the luxury market, brands have achieved even further importance as the concept of luxury shifted from possession (ownership of luxury goods or ostentation of ownership as a status symbol) to experience (ownership is often a pre-requirement but the aim is improving quality of life). This trend led all luxury brands (not only fashion-sensitive ones) to develop explicit branding strategies and to consider them as a crucial element of competition (eg Ferrari's leverage waiting list of about 18 months to create a 'waiting experience' which fosters the feeling of uniqueness and exclusivity) (Kesner and Walters, 2005). Such strategies aim at creating a solid 'brand equity' (ie the overall value of a brand, according to the Marketing Science Institute 'the set of associations and behaviours on the part of the brand's customers, channel members and parent corporation that permits the brand to earn greater volume or greater margins than it could without the brand name and that gives the brand a strong, sustainable and differentiated advantage over the competitors') associated to a 'brand image': typically this requires a set of steps such as choosing a target positioning, defining the brand identity and transforming it into visible aspects in order to enhance reputation. Brand identity is what a company wants a brand to be, the values it must represent, the whole of mental associations. Brand image is what is perceived by customers and stakeholders.

In particular, capturing, maintaining, or increasing market share, either for fashion or luxury products, requires a specific branding/marketing/merchandising strategy. Suggested tactics include correctly targeting narrowly defined segments of potential consumers with the appropriate marketing mix; defining a high brand image coherently with the target pricing level; identifying unmet needs and sales opportunities; using carefully designed packaging; increasing advertising budgets to educate consumers (D'Arpizio *et al*, 2005; Steinberg, 1998; Summers *et al*, 2006).

No one could deny that achieving the appropriate brand positioning and building its reputation is an absolutely necessary condition for success in the luxury market. Nonetheless, the relevance of whatever lies beyond the market surface (eg operations and supply chain) is now acknowledged by both academics and practitioners: in other words, it is necessary to provide substantive demonstration of excellence, delivering up to the expectations created by the brand pledge (Aaker, 1991).

Support for this opinion comes from one of the most influential men of the luxury world, Bernard Arnault (CEO of the LVMH group), who – at the International Herald Tribune's Luxury Business Conference in 2007 – declared that 'high standards can and must be maintained throughout the supply chain, from production to distribution in retail stores'. A further eminent opinion comes from François Pinault (CEO of the PPR-Gucci group) who (at the at International Herald Tribune 2006 Luxury Conference) suggested going back to considering 'product' as the fundamental element for competing in the luxury business (ie paying more attention to product itself would allow a company to focus on the highest end of the luxury market).

Table 6.1 summarizes the recent trends in the luxury business and the related challenges for SCM.

TABLE 6.1 The challenges of supply chain and operations in the luxury business

Recent trends in the luxury business	SCM challenges
<p>Success in recent years was based on building brand image and on extending product range:</p> <ul style="list-style-type: none"> ● loss of 'material' competitive advantages; ● risk of diluting brand exclusivity into accessible lines. 	<p>Back to basics – market orientation, product quality, service level, mastering core competences – to regain the ability to deliver up to the promises made by the brand</p>
<p>Consumers are now more literate as regards quality in product/services and accept a premium price when their requirements are satisfied</p>	<p>Guaranteeing adequate quality even though (part of) the production process is outsourced</p>
<p>Fashion effect: product lifecycle is every day shorter</p>	<p>Flexible and responsive SCs</p>
<p>Rising attention to operations and SCM, with a number of companies currently restructuring their supply chains (Prada, Bulgari, Versace, Ferragamo...)</p>	<p>SCM is now one of the top priorities in management's agenda, operations are more stressed</p>
<p>The soaring of scale and bargaining power of major retail buyers in the market, the advent of own brands retail networks, globalization of luxury consumers</p>	<p>Attention to distribution and retail</p>
<p>Wide use of outsourcing of manufacturing processes; off-shoring of manufacturing activities and sourcing on a global scale</p>	<p>Need to control and coordinate a large and geographically scattered network of actors</p>
<p>New and aggressive players are now entering the market</p>	<p>Need to create a sustainable competitive advantage, leveraging the capability of all the 'partners' within the supply network</p>
<p>Different requirements depending on the type of luxury (eg accessible lines require availability; exclusive segments require superior service)</p>	<p>Need to develop a differentiated approach</p>

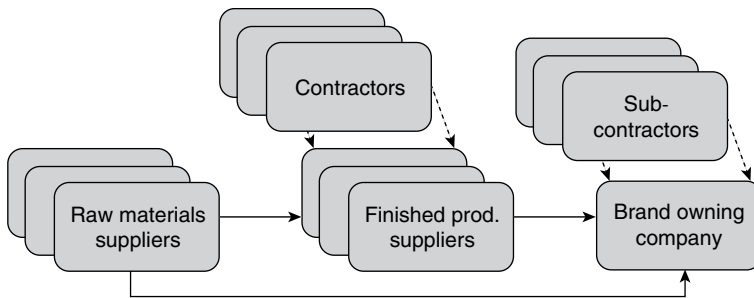
Typical structure of the inbound and outbound supply chain

To be able to analyse the SCM strategy of companies in the luxury and fashion industry, it is important first of all to briefly discuss the typical structure of both the ‘upstream’ supply chain (how raw materials are flowing towards the manufacturing sites) and the ‘distribution channel’ (how end products are distributed to the final consumer), with the standpoint of the ‘brand owner’ (BO).

Inbound supply chain

The typical structure of the inbound supply chain – as represented in Figure 6.1 – encompasses suppliers of raw materials, suppliers of components and finished goods, and sub-suppliers.

FIGURE 6.1 The typical structure of an inbound supply chain



In comparison with other industries (such as the aerospace or the automotive), the idiosyncrasies of such a configuration are a sign of quite a naïve supply chain strategy, and – if not properly managed – could become a relevant issue threatening overall supply chain performances:

- high fragmentation of the production system, with a plethora of actors, each one taking care of a tiny part of the overall process;
- ‘captive’ relations with subcontractors – often working for the BO as their sole customer;
- lack of formalized, written agreements, let alone long-term contracts;
- outsourcing of some design activities to finished product suppliers – this is not an issue, provided that this practice is limited to extension lines and lower positioning products;

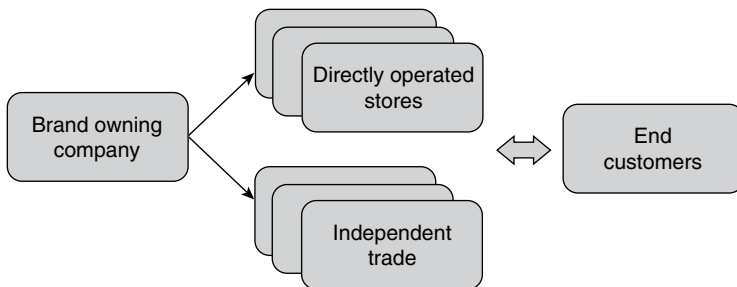
- customized raw materials – this is a strength for higher-positioned, luxury products; yet, customized materials require proper and careful production planning and inventory management.

Outbound supply chain (distribution channel)

The typical structure of the outbound supply chain, depicted in Figure 6.2, encompasses the two noteworthy cases of directly operated stores (DOS) and independent trade (including a gamut of retail formats, from stand-alone shops to department stores).

Ownership and control of the trade, along with the duration of the product lifecycle, are significantly influencing management choices in the outbound supply chain (in terms of IT tools, assortment planning, demand forecasting, approach towards replenishment).

FIGURE 6.2 The typical structure of a distribution channel



Frameworks for company classification and supply chain strategy selection

A study involving several Italian brands (Castelli *et al*, 2009) provides a useful model for classifying fashion companies on the basis of two fundamental elements of the competition in this market, ie the target positioning of the brand and the duration of the product lifecycle (shelf-life).

Indeed, many approaches were proposed for classifying fashion-luxury brands with respect to their positioning on the market. For instance, Fernie *et al* (1997) observe that most of the companies operating in the fashion luxury business manufacture and sell, beside their exclusive ‘haute couture’ products, one or more ‘diffusion lines’: these are relatively low priced and available in relatively large volumes, in order to reach a wider consumer segment and introduce them to the brand’s lifestyle. Beverland (2004) divides the total market for a product type into four classes: the mass level

(addressed as ‘bulk’) plus three premium levels. These go from premium to super-premium to icon level and present growing relevance of exclusivity as a critical success factor. Dubois and Czellar (2002) indicate that exclusiveness and desirability increase moving from ‘prestige’ brands (which are characterized by high quality or performances) to ‘luxury’ brands (which in addition include perception of comfort, beauty and refinement). Catry (2003) splits the luxury market between exclusive goods, which rely on rarity in terms of natural shortages (of materials and manufacturing capacity), limited editions or in terms of techno-rarity, from more accessible lines in which rarity is basically ‘information based’, eg achieved through selective distribution, elitist shopping atmosphere, price, provenance from heritage centres, packaging, combination of two brands. Silverstein and Fiske (2003) identify the ‘new luxury’ category where consumers are not so much interested in the product itself as in its brand image. Indeed, ‘new luxury’ refers to goods, which are not necessarily rare or manufactured in low volumes: they achieve the ‘luxury good’ status thanks to design, to additional services or to the aura created around the brand. The emergence of ‘accessible luxury’ products is partly a result of the ‘trading up’ tendency characterizing consumption habits nowadays.

Two classification variables: target positioning of the brand and duration of the product lifecycle

D’Arpizio (2007) identifies three classes for luxury goods, observing that different performances are achieved in different markets. The same three categories are consolidated by the Fashion&Luxury insight of Bain & Altagamma (Altagamma, 2008):

- Absolute luxury products, characterized by elitism, heritage and uniqueness (eg Harry Winston, Hermes). These products constitute the luxury goods segment that traditionally drove the market and indeed is still strong in one of the most important markets, Japan.
- Aspirational luxury products, which are recognizable and/or distinctive, and represented by such brands as Gucci and Louis Vuitton. These represented the largest rate of luxury goods growth in the United States.
- Accessible luxury products, characterized by affordability, status and membership, and represented by such brands as Coach and Burberry. In the past few years, this category achieved a huge growth rate in Asia-Pacific (excluding Japan) – nearly 2.5 times greater than the global average for ‘accessible luxury’ sales growth. This leads to the conclusion that sales growth in Asia-Pacific is driven by a high degree of entry-level access to luxury goods.

As suggested by an in-depth analysis of the literature, beyond the three types of luxury listed above, also the category of mass-market goods should be included when dealing with the fashion business.

The second classification variable, ie duration of lifecycle or shelf-life, finds much reference in the literature dealing with supply chain, often with specific reference to the fashion industry. For instance, Cigolini *et al* (2004) specifically suggest the most suitable supply chain strategy approach depending on lifecycle duration and explicitly cite a fashion company as a typical example of short lifecycle products. However, despite the lifecycle of fashion products being surely shorter than in other industries, a further distinction can be made.

According to Jacobs (2006) it is necessary to distinguish, at least, between fashion and continuative products: the former are proposed for just one season, while the latter are sold for several seasons. The recent success of fast-fashion brands and the introduction of special collections led to a further subdivision of fashion products resulting into three classes:

- Continuative items: products that have a lifecycle longer than 20 weeks. These include both basic or iconic items (that since the conception phase are meant to stay on the market for several years) and carry-over items (products that are initially included in seasonal collections but, due to their success, are proposed again in the following seasons).
- Seasonal items: products that have a lifecycle of about 20 weeks (one season).
- Fashion items: products that have a lifecycle of about 10 weeks or shorter. These include cruise collections, fashion capsules, fast fashion items and so on.

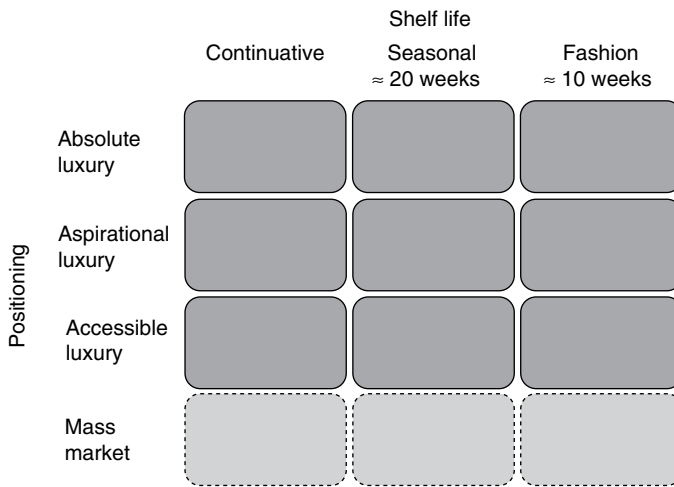
The resulting classification scheme

By segmenting the companies operating into the fashion industry according to the segmentation variables introduced in the previous subsection, the classification scheme presented in Figure 6.3 emerges.

Along the horizontal axis, some consolidated models for supply chain strategy provide useful suggestions, at least when dealing with the lower part of the matrix, where accessible luxury firms and brands are placed. According to Christopher and Towill (2002) or to Cigolini *et al* (2004), the more we move to the right, the more the supply chain strategy should shift from lean to agile. In particular, a fast-fashion approach could be suitable for brands/items competing in the lower-right portion of the matrix.

It is important to notice, though, that fashion companies typically offer a portfolio of items and brands with different positioning on the matrix, hence sometimes antithetic approaches might coexist within the same company.

Applying, for instance, Fisher's model (1997), items positioned on the left side of the matrix could be assimilated to functional products for which an efficient supply chain could fit. Indeed, these items are typically characterized by low variety and a predictable demand (at least at aggregate level – demand forecasting at retail store level is much more problematic);

FIGURE 6.3 Classification of fashion items

deliveries up to finished product warehouses can be planned in advance. Basic and continuative products often also have low contribution margins: hence, it is fundamental to minimize supply chain costs through the elimination of non-value-adding activities. Further actions in order to pursue efficiency include suppliers' selection based on costs, maximizing plants and workforce utilization rate, preventing excessive expenditures in innovation, restyling and promotion.

These guidelines do not properly work when it comes to iconic items (typically positioned on the upper-left area): despite their being characterized by low variety, demand predictability and long lifecycle – which would suggest classifying them as 'functional' products – their high contribution margins and, above all, the required excellence in terms of material quality and service level suggest that putting the priority on efficiency along the supply chain is not a good idea, as it could jeopardize the product/brand image (through bad quality or low service level).

In contrast, moving towards the right side of the matrix, a more responsive supply chain is advisable, in which the stress on innovation (which often means large investments on style, design, total look collections, in-store experience, testimonials, etc) is paramount and high product variety is the natural consequence. Hence, the whole supply chain should be aiming at responding to market demand rapidly and with an appropriate product offer. This would require the deployment of a consistent supply chain strategy, with such actions as: monitoring the target markets in order to identify immediately new opportunities and trends; developing appropriate retail channels; accurate stock planning in order to balance stock-out and left-overs; applying design-for-SCM techniques; reducing lead times as much as

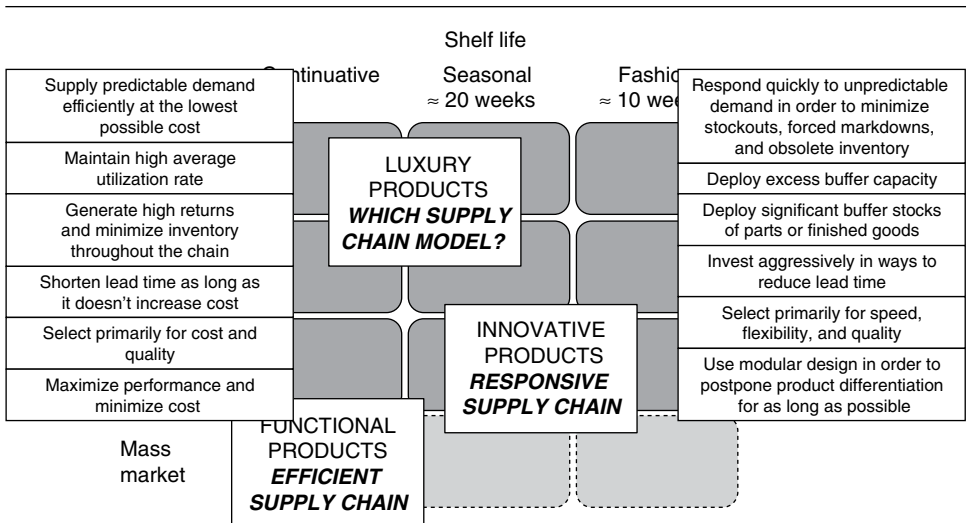
possible; selecting suppliers on the basis of speed and flexibility; increasing the number of outsourcers in order to have buffer capacity; collaborating with suppliers, manufacturers and retailers in order to maximize the flexibility of the whole system.

However, when dealing with the higher segment of the market, this type of supply chain approach also presents some drawbacks. For instance, it would not be so easy to keep a buffer of manufacturing capacity when the heritage of craftsmanship is a critical success factor or when technical lead times cannot be reduced. Moreover, extreme luxury companies and brands typically tend to avoid the ‘fashion effect’, thus reducing seasonal items and – possibly – altogether eliminating fashion ones. For such companies, the style and design of a real luxury object is often regarded as timeless and, thus, evergreen by definition (which, by the way, reinforces the ethical message brought forth by luxury firms – that luxury must be and indeed is a sustainable business, trying to run away from the consumeristic mindset of fast fashion).

Refining the classification: the case of absolute luxury

As pointed out in the concluding remarks of the previous section, and summarized in Figure 6.4, whereas traditional supply chain models and theories could easily be transferred and applied to the case of accessible luxury and fashion companies, the case of extreme luxury needs to be addressed with more attention.

FIGURE 6.4 Application of Fisher’s (1997) model to fashion items



In fact, Caniato *et al* (2009) studied the application of consolidated supply chain strategy models to the luxury segment of the market and highlighted inadequacies of previous supply chain strategy literature. Hence, they first identified some useful classification variables with a relevant impact on the supply chain strategy selection. They were then able to identify common choices along the supply chain for three clusters of luxury companies (Caniato *et al*, 2011).

A total of 15 in-depth case studies were performed, involving many Italian luxury companies. For each company, the most representative product family was selected and analysed. Considering figures related to those product families, companies were then classified according to their selling volumes (high/low, in terms of units sold worldwide per year) and product complexity (high/low), obtaining the following three clusters, which proved internally homogeneous with respect to the practices in use along the supply chain:

- cluster 1 typically includes large fashion luxury companies, with worldwide renowned brands, selling high volumes of products;
- cluster 2 encompasses niche brands, selling relatively low volumes of excellent quality products;
- cluster 3 is constituted by fairly large firms, manufacturing and selling complex products in extremely low volumes.

Cluster 1: high volumes and low complexity

In terms of CSF, brands in Cluster 1 are placing most emphasis on building an emotional appeal for the brand as well as emphasizing premium quality; other relevant aspects are style and design, country of origin and heritage of craftsmanship. However, common operational performances are also very relevant, especially service level and delivery lead time to retail stores.

Facing a short product lifecycle and a scarcely predictable demand, the supply chain has to be efficient in the production phase and flexible during the replenishment phase in order to follow a demand pattern that is unpredictable both in terms of volume and content. Firms typically apply a make-to-stock strategy for just a part of the product range (ie they implemented a hybrid approach, in line with Bruce *et al* 2004). Indeed, a pure make-to-stock approach is not suitable for luxury companies, as the high value of their products generates a significant risk of obsolescence. Electronic management of purchasing orders and sales monitoring technologies can be introduced in order to better follow the demand. Continuative items (for which obsolescence risk is lower) are planned and produced in large batches.

Although theoretically compatible with the case of low complexity and high volumes, offshoring strategies are rarely used. In addition, offshoring could negatively affect service level and delivery lead times. Within the analysed sample, only entry-level products and some accessories are produced

offshore. This is a major difference as compared to the mass market, where production is heavily offshored.

Outsourcing is a common practice. While in the mass market this happens for commodity items and/or for the most labour-intensive production phases, luxury companies often outsource in order to access specialized know-how, or even craftsman skills, since heritage of craftsmanship is a relevant CSF. Of course, strong coordination with supply chain partners is mandatory in order to ensure homogeneous quality and service level. A typical configuration is that of Italian luxury leather goods brands that outsource manufacturing of leather goods to a wide network of very small and specialized local companies, managing the relationship with these ateliers as if they were part of the focal company. Strict control is applied over components and raw materials utilization, order scheduling and delivery planning, both to ensure compliance with production plans and to prevent the risk of counterfeiting via parallel markets.

The sourcing process must ensure high quality in raw materials and components; every phase of the manufacturing process must comply with the desired quality level to deliver a genuine, premium-quality product. As a consequence, materials must often be sourced from particular countries (eg tanned leather from Italy, cashmere wool from India, or crocodile from Australia) and reliable suppliers.

Vendor selection criteria vary according to the supplier type. Superior quality is the main criterion when purchasing critical materials (eg leather or special fabrics for leather goods manufacturers), while suppliers of standard materials (eg small metal components for bags and shoes) are selected on the basis of their cost/service level ratio. Companies often prefer to buy the most critical materials in advance and keep them in stock (eg raw cashmere wool) in order to secure the finest quality batches and/or to reduce dependence on supplier delivery performances.

As for the distribution process, retail channels should be selected, organized and managed in alignment with the brand's most important CSFs (Lee, 2004; Brun *et al*, 2008). Product display, availability and variety at the point of sale are essential for confirming the brand aura of excellence; in particular, a complete shopping experience conveys the appropriate emotional appeal, which is another relevant CSF, and contributes to customer satisfaction and to the feeling of direct contact with the manufacturing company. Beyond selling through department stores and independent shops, control over the distribution network is pursued mainly through two approaches: directly operating a network of points of sale, often designed by famous architects as concept stores; this approach is often limited by financial constraints and by the lack of space in the most attractive and prestigious areas (eg, historical city centres); and alternatively, relying on non-directly operated mono-brand points of sale (ie, franchising stores) and training the shop's personnel regarding product features and customer relationships.

In any case, electronic ordering systems, monitoring sales and tracing customer information are useful tools for effectively managing the channel.

In the most advanced cases, there is the possibility of transshipment among shops (ie shop managers have real-time visibility of the stock available in other shops; this way, one shop facing a stock-out of one particular item variant, colour or size could order and receive it directly from another shop in a very short time, without having to wait for the long lead time replenishment from the factory).

A summary of the findings related to companies in Cluster 1 is given in Table 6.2.

TABLE 6.2 Common supply chain choices for high volumes/low complexity luxury brands

<p>Companies in the cluster:</p> <ul style="list-style-type: none"> ● Large firms ● Apparel, shoes, leather goods, accessories → 'fashionable' products ● Brands are more symbolic/emotional than technical in their nature ● Global brands ● Accessible, Aspirational and Absolute brands ● Made in Italy as a major CSF (respect of the Mil label rules). Other CSF: emotional appeal, recognizable design, brand reputation ● Delivery lead times and availability are market requirement 	<p>Demand/Product</p>	<p>Seasonality, volatile fashion trends, short maturity period, some carry-over products</p>
	<p>Manufacturing</p>	<p>Flexibility in design and engineering</p> <p>Prevalent Make To Stock approach → efficient for carry-over products</p> <p>IT tools in use: ERP, EDI</p> <p>Outsourcing for accessing specialized competences, strict outsourcer control</p> <p>Off shoring for non-core items</p>
	<p>Sourcing</p>	<p>Critical materials of finest quality from areas of excellence</p> <p>Established relationships, dedicated investments</p> <p>Information sharing, collaboration</p>
	<p>Distribution</p>	<p>Distribution channel control through mono-brand stores (owned or franchised)</p> <p>Ensure in store availability and variety</p> <p>Electronic ordering systems</p> <p>Fidelity programs</p> <p>Trans-shipment of goods</p>

Cluster 2: low volumes and low complexity

Cluster 2 includes small luxury fashion companies, typically niche brands, selling relatively low volumes of excellent quality products. Indeed, such companies' reputation reflects the content of their products (materials and manufacturing processes) rather than the symbolic value of their brands.

The main luxury CSFs for Cluster 2 are premium quality, country of origin and craftsmanship; reputation of these companies is also based on excellent service levels. Attention to costs is higher than in the previous cluster.

Due to their small size, these players have less freedom in formulating their strategies; for instance, they can hardly own a network of directly-operated points of sale and their bargaining power over suppliers is limited.

As regards manufacturing, due to their size, these companies often adopt a purchase-to-order or make-to-order policy, with orders to be placed soon after the presentation of new collections, as required by their long manufacturing lead times; furthermore, due to small production volume and significant demand variability, these companies prefer not to carry the stockholding costs implied by a make-to-stock approach. In contrast to brands in cluster 1, these players offer large independent retailers the possibility of exclusive customized products.

The products of these firms often require high-quality hand-made details, hence the availability of specialized craftsmen is fundamental; handcrafting also contributes to making each item a unique piece, thereby increasing its degree of exclusivity.

Outsourcing is a common practice, but only within national boundaries: when the 'country of origin' is a fundamental CSF, all production phases (even when outsourced) should actually take place in Italy. For companies in this cluster the label 'made in Italy', synonymous with high quality and original design, strongly contributes to justify the premium price. There are further reasons to keep production local: offshoring may require a significant investment and would have a negative impact on service level.

Suppliers and outsourcers of specific phases are carefully selected and the company strictly monitors their operations. In some cases, luxury firms outsource all phases of manufacturing to several neighbouring craftsmen or small companies often belonging to the same industrial district, which are virtually considered as their own production department. Typically, each product line is assigned to a single outsourcer in order to ensure consistency in the product's aspect.

In contrast with companies in Cluster 1, the focal company often cannot rely on a bargaining power advantage over its outsourcers, due to its small size. Therefore, the focal company is quite vulnerable to delivery delays or shortages and at times, larger outsourcers can even dictate contract conditions.

For these firms, it is essential to maintain long-term relationships with suppliers. As in Cluster 1, suppliers of critical materials are evaluated on the basis of quality while those supplying standard materials are assessed on

the cost versus service level ratio. Other relevant criteria when selecting a supplier are past experience working for other luxury players and exclusive specialization or unique expertise with a certain material or manufacturing process.

These companies are more focused on the product than on the brand's emotional aspects. Hence, distribution and marketing investments are very limited. Often, they do not own mono-brand stores but rather prefer to rely on the reputation of experienced luxury retailers. However, the lack of directly operated points of sale makes it harder to control the distribution network and to access sales data and customer information.

Evidence related to Cluster 2 are summarized in Table 6.3.

TABLE 6.3 Common supply chain choices for low volumes/low complexity luxury brands

<p>Companies in the cluster:</p> <ul style="list-style-type: none"> ● Small firms ● Apparel, shoes, leather goods → 'fashionable' products ● Brands are more technical than symbolic in their nature ● Niche brands going global ● Accessible, Aspirational and Absolute brands ● Made in Italy as a major CSF (respect of the Mil label rules) together with Heritage of Craftsmanship and Premium Quality ● Customer service is a must ● Company size makes costs a relevant issue 	<p>Demand/Product</p>	<p>Seasonality, volatile fashion trends, short maturity period, carry-over products, customized products</p>
	<p>Manufacturing</p>	<p>Purchase To Order, Make To Order Hand making for several details Outsourcing: national outsourcing to small firms, outsourcers control and coordination Parallel sourcing</p>
	<p>Sourcing</p>	<p>Critical materials of finest quality from areas of excellence Established relationships Frame agreements, open orders</p>
	<p>Distribution</p>	<p>Established relationships Official resellers</p>

Cluster 3: low volumes and high complexity

The third cluster includes large firms that sell low volumes of complex products that can be included in the fashion market if this is considered in a larger meaning (ie beyond apparel and leather goods, also home-decor,

furniture, watches and jewellery etc, have now assumed a fashion value in the consumers' minds). The technical performance of the product is at the origin of their brand's prestige.

This cluster will be discussed in more general terms, as companies in this cluster are typically operating outside of the 'strictly speaking' fashion world.

In terms of manufacturing, these companies produce based on actual orders or using an assemble-to-order policy when offering customized products with short lead times. Indeed, in this cluster, a remarkably strong request for customization comes from the market; consequently, manufacturing processes must be flexible enough to accept even last-minute order changes.

A high level of vertical integration is observed, revealing the desire to exert direct control over most of the production process in order to ensure quality and uniqueness. Outsourcers, when used, are selected on a national basis in order to achieve flexibility, short lead-times and service level, rather than for country-of-origin reasons. Outsourcers are usually small and medium firms; each year, the luxury company defines a shared production plan and, on this basis, signs an agreement with the outsourcers, hereby booking a certain amount of their production capacity. Thanks to long-term relationships, strengthened by dedicated investments, luxury firms are obtaining from their supplier base outstanding process and product quality.

Due to product complexity, the upstream network is very articulated and coordination tools and vendor-rating processes are needed. Company size and long-term relationships allow companies to strictly control their first-tier suppliers and to help them in their technical development.

Suppliers could play a part in the innovation process, and some of the most critical components they provide have a strong impact on performances of the final product and also on the perceived quality, strengthening the luxury status of the brand (think about a Ferrari supercar proudly sporting Brembo brakes or a Bose sound system). For these reasons, suppliers are selected primarily for quality, reputation and innovation capabilities.

Depending on the product category (eg yachts, cars, wood and furniture), these companies might prefer to distribute their products through mono-brand, directly-operated stores or multi-brand independent dealers. The selling process is accomplished through an intense dialogue among the customer, dealer, firm and other relevant actors such as architects before the product takes its final shape. These firms pay great attention to service level, which is achieved through initial advising, on-time delivery, before- and after-sales assistance and other benefits needed by luxury customers. As a consequence, no matter what the distribution channel selected, these companies monitor strictly the service level of their dealers.

Findings related to Cluster 3 are summarized in Table 6.4.

TABLE 6.4 Common supply chain choices for low volumes/high complexity luxury brands

<p>Companies in the cluster:</p> <ul style="list-style-type: none"> • Large firms • High item value • Cars, yachts, furniture → investments more than consumables • Brands are both technical and symbolic in their nature • Global brands, niche market • Aspirational and Absolute brands • Technical performances are a major CSF and are at the base of brand's prestige. Country of origin is not relevant 	Demand/Product	Little seasonality, long product lifecycle, long lead times accepted
	Manufacturing	Purchase To Order, Assembly To Order Levelled scheduling, Just In Time Flexibility for 'last minute' customization Outsourcing for very few production phases: long term relationships, dedicated investments National outsourcers chosen for flexibility reasons
	Sourcing	Structured Vendor Rating Strategic renowned brand suppliers Excellent suppliers from different industries Very articulated upstream network
	Distribution	Direct marketing channel Mono-brand directly operated stores Multi brand dealers: subject to ratings

Noteworthy examples of supply chain configurations

To give a better idea of the configuration of specific luxury fashion supply chains, the following three cases excerpted from Brun and Castelli (2008) are presented. Albeit being constituted by all mid-size, Italian companies, the sample is quite differentiated in terms of product categories they produce and distribute (shoes, leather bags and accessories, swimwear and underwear), and different positioning of their brands (ranging from luxury to diffusion lines). This will allow a better comprehension of different supply chain configuration and management strategies.

A general summary of the three cases is given in Table 6.5, while deeper insights are provided in Boxes 6.1, 6.2 and 6.3.

TABLE 6.5 Synoptic table of the three noteworthy examples

	Fratelli Rossetti	Bric's	Parah
Core business	Luxury shoes	Bags and suitcases	Swimwear and underwear
Product categories	Formal men's shoes Formal women's shoes Sports shoes Accessories	Suitcases Office bags Handbags Accessories	Swimwear Underwear Concept wear Accessories
Brands positioning and personality	<p>Fratelli Rossetti (company owned): luxury brand. Excellent quality, heritage of craftsmanship, made in Italy</p> <p>Flexa (company owned): diffusion brand. Sport, good quality, quality/price.</p>	<p>Bric's (company owned): high positioning brand. Innovation, design, high quality.</p> <p>Kipling (licence for distribution only): diffusion brand. Sport, young.</p>	<p>Parah (company owned): luxury brand. Excellent quality, characterizing design, innovation, made in Italy.</p> <p>Off Limits (company owned): diffusion brand. Basic design, good quality, quality/price.</p>
Retail channels	DOS mono-brand stores Franchising mono-brand stores Specialist independent retailers Department stores (corners) Factory outlets	DOS mono-brand stores Specialist independent retailers Department Stores Factory outlets Airport lounges	DOS mono-brand stores Franchising mono-brand stores Specialist independent retailers Department stores (corners) Factory outlets Airport lounges

Box 6.1 Calzaturificio Fratelli Rossetti

The 'Calzaturificio Fratelli Rossetti SpA', with a turnover of €78 million in 2012 and a year-on-year growth of about 10 per cent in the past few years, is a luxury shoes manufacturer, famous worldwide for the excellent quality of its products which allowed the company to achieve a very high brand reputation. Such reputation is mainly due to the heritage of craftsmanship as regards the company's core product – high quality formal men's shoes. The company, whose headquarters are located in one of the most renowned Italian shoe districts, started its activity at the beginning of the 20th century and, along the years, expanded its competences from bare shoes manufacturing to product design both in terms of functionality and style, so incorporating the current trends which require every day more style content in fashion products.

Men's shoes were initially sold under the company name brand (Fratelli Rossetti), while women's shoes were added later, in order to complete the product range. In contrast to a common misbelief, the manufacturing process for high quality shoes not only includes many handmade stages but is also extremely complex, involving several phases and a number of time constraints (eg 24 hours are needed to properly dry the glue to fix the two main subassemblies of the shoe). Furthermore, the process is significantly different for men's shoes and women's shoes, not only because of physiological differences in the shape of the feet but also due to differences in component type and in the variety range.

Such structural differences in the product are the reason why, while the process for manufacturing men's shoes is completely performed in the company facilities in the original Italian district (with a few exceptions for special refining phases required by particular items), the company decided to outsource the manufacturing process for women's shoes to specialist manufacturers in the same district. Hence, the company – as regards women's shoes – manages internally the design phase, the distribution process and the material selection process, while outsourcing all the manufacturing phases as well as the product development and engineering. Outsourcers are selected on the base of product quality and service level (mainly delivery lead times) and are therefore located within the district, also in order to allow the use of the 'made in Italy' label.

Lately, the company also introduced the brand Flexa for diffusion purposes, ie inviting new consumer segments to approach the company's offer. With Flexa, the company offer expanded to a new product category,

namely sports shoes. As these products are meant to offer a good quality/price balance while – given the lower brand positioning – the ‘made in Italy’ label is not required, the company decided to design the products in house while delocalizing all of the manufacturing phases to outsourcers in eastern Europe.

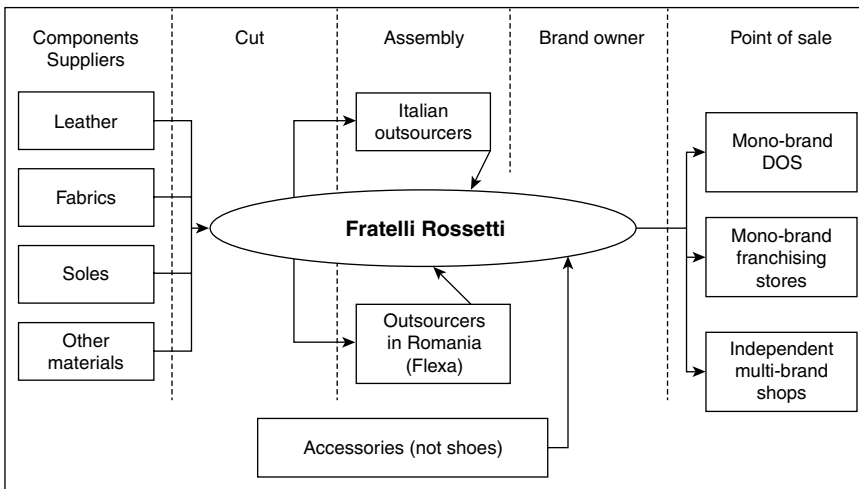
The company’s products are sold through a variety of retail channels. Some differences can be observed in the product mix available to the different channels:

- DOS mono-brand stores have a precise style characterization, in terms of store design, furniture, colours and service standards. The store personnel is directly employed by the company and is required to attend a training course in order to correctly communicate the company and brand image. These stores have access to the whole product range, and the merchandise mix available in each store is centrally decided by the company’s marketing department; these stores also benefit from direct contact with the company (through a shared information system) and from the possibility of replenishment with short lead times (often the company manufactures Made to Order products to deliver to these stores). Thanks to the shared information system, the company can access sales data, thus getting a better insight on the current demand and an input for the forecasting process.
- Franchising stores present the same store design, style and image characterization as DOS stores; in contrast the personnel is not directly employed by the company and therefore not necessarily trained to communicate the brand. These stores can also access the whole product range, but they mainly interact with the company placing one order per season; sometimes exceptions (eg buyback or transshipment between stores under special conditions) can be allowed. Corners in department stores and in airport lounges are managed in the same way as franchising stores.
- Independent specialist stores do not have to follow strict requirements in terms of store design, but are selected by the company on the basis of the range of carried brands. They can only access part of the company product collection and have to place orders exclusively during the selling campaign. Their relationship with the company is intermediated by agents. The company applies a Make to Stock manufacturing strategy for products destined for both franchising and independent stores.

- Factory outlets are owned by the company and are mainly regarded as a way to minimize the losses due to unsold products.
- The company also designs and distributes leather accessories (bags, wallets, key rings), but – as they are not regarded as core products – their production is completely outsourced to specialist companies. Moreover, due to the range completion purpose of such accessories, they are exclusively sold in the mono-brand DOS and franchising stores.

The resulting supply chain configuration is depicted in Figure 6.5.

FIGURE 6.5 Calzaturificio Fratelli Rossetti: supply chain configuration



Box 6.2 Bric's Industria Valigeria Fine

'Bric's Industria Valigeria Fine SpA' (whose turnover is about €40 million) is an Italian manufacturer of high quality travel suitcases, handbags, office bags and accessories (such as wallets, key rings, small leather cases). The initial business, which dates back to the middle of the 20th century, was focused on leather travel suitcases and office bags, which were mainly sold locally (in northern and central Italy). The high quality of the products (which derived mainly from high quality leather sourced in Italy

and from exceptional craftsmanship capabilities) soon led to growing demand, not only from local customers: soon the company evolved from a small family-run business to an international player in the fashion market.

Other product types were added to the offer besides travel items: the natural product line extension was towards women's handbags, which could easily be manufactured in the existing production facilities. However, the introduction of such products required the company to achieve a good level of understanding as regards product design, not only in terms of manufacturing and material requirements but also in terms of style issues. Further development in terms of products was the introduction of materials different than leather, for instance fabric and polymeric materials. Such new materials, on the one hand, required new manufacturing competences and, on the other hand, proved much less expensive than genuine leather.

At the same time, the company realized that the physical characteristics of their products were no longer enough to compete on the fashion market and understood the need for establishing a proper fashion brand. Thus, a strong marketing effort was put on the creation of a set of positive fashion associations to the company name, ie brand values. From that moment on, the stage of product design had to explicitly take into account the need to create brand-consistent collections.

As demand and product variety increased, the company differentiated the manufacturing process for different items: the decision was to keep in house the whole manufacturing process for high quality leather goods and suitcases with high material technology contents, while production of low priced lines (low cost materials, sold at relatively low price on the consumer market in order to attract young fashion-sensitive people) was outsourced to companies in the Far East.

Bric's has a large network of suppliers and outsourcers. Most of them work on the basis of spot orders or an annual contract. Thanks to a long-term relationship, some high quality specialist outsourcers allowed the introduction of collaborative supply programs. However, there is no IT supported information exchange with them, as their small size doesn't allow significant IT investments.

The main retail channel for the company's products has always been that of independent specialist retailers, with some of whom the company was able to build a strong long-term relationship. A relevant achievement, with respect to these partners, was the introduction of a shared information system: each retailer communicates periodically (some of

them daily) its sales to Bric's, which, in turn, provides updated information about its inventory status. The orders from retailers participating in such a system typically have priority compared to orders from less loyal retailers.

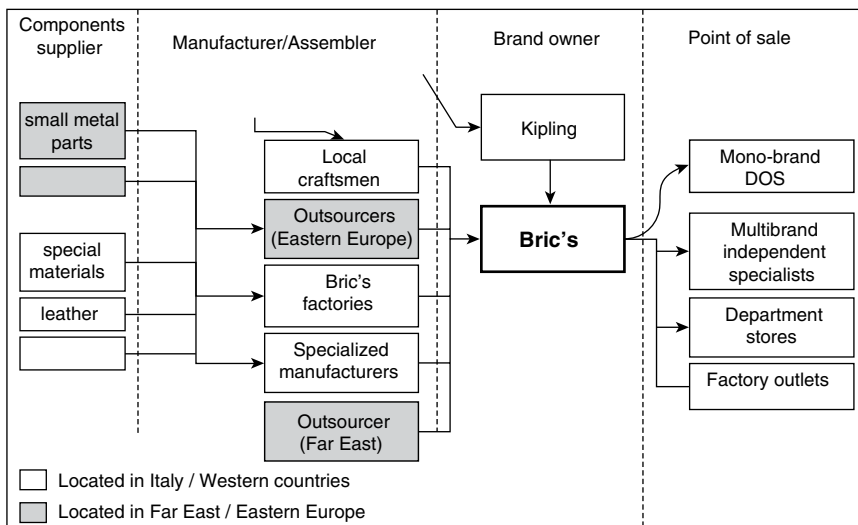
Recently the company expanded its direct activity to retail, by opening a network of direct operated stores. These are mainly flagship stores through which the company is supporting its expansion to foreign markets: indeed flagship stores have a strong brand establishment purpose. As these stores are directly operated, their access to the information system is enhanced compared to independent retailers. Sales data and inventories are visible in real time, so that demand trends can be anticipated and replenishment of specific items can be centrally planned by the company.

Thanks to information sharing with DOSs and selected retailers, Bric's was able to replace, for some product families, the original Make to Stock policy with a Make to Order one.

From the beginning of the 90s, the company also acquired a licence for exclusive distribution in the Italian market for the brand Kipling.

The resulting supply chain configuration is depicted in Figure 6.6.

FIGURE 6.6 Bric's Industria Valigeria Fine: supply chain configuration



Box 6.3 Parah

Gruppo Parah SpA, with more than €30 million turnover and about 170 employees, is one of the world's top 10 manufacturers of fashion lingerie and swimwear. The company was established at the beginning of the 20th century as a craftsman shop of high quality lingerie. The founder, an Italian lady with a strong interest in fashion, identified the need for creating women's lingerie products that were both comfortable and extremely stylish. The natural product extension was in the business of swimwear: these items were introduced as soon as the activity shifted from a craftsman shop to an industrial company. A third product category was recently introduced, ie concept wear, an apparel line characterized by comfortable fabrics, casual purpose and fashion design.

The exclusive positioning in the luxury niche of the market was seen as a limitation for demand growth. Hence, beside the original luxury lines for which the company brand (Parah) was renowned, diffusion lines were introduced under a different brand (Off Limits).

As time went by, the company realized that it was worth deciding which competences were to be kept in house and which could instead be delegated to outsourcers. Nowadays the company keeps the processes of product design and new product development completely in house: indeed, product innovation (both in terms of style and functionality) is one of the critical success factors targeted by the company. Furthermore, the company keeps the fabric cutting phase for the luxury lines in house, while the assembly phase is outsourced to local manufacturers, to allow for the use of 'made in Italy' labels. In contrast, the whole manufacturing process is outsourced in the Far East for the diffusion lines. As regards accessories (such as perfumes, scarves, gloves, small bags) both design and production are completely outsourced to specialized Italian companies.

All the products are then stored in the company warehouse where statistical quality controls take place; then appropriate branded packaging is applied to every item and a delivery box is prepared specifically for each store.

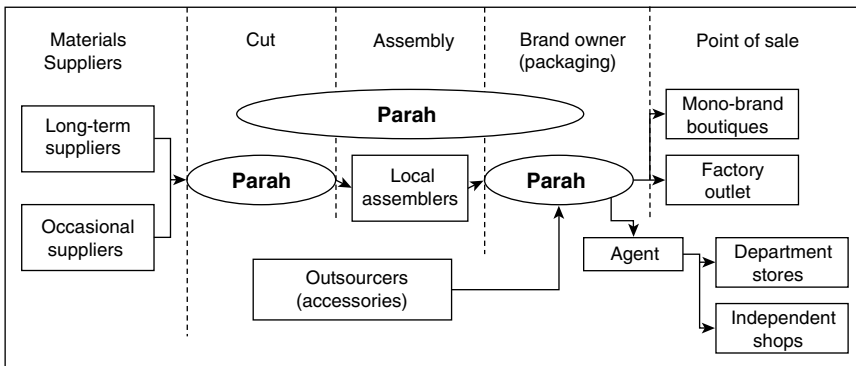
The company's products are sold worldwide through 52 mono-brand stores (accounting for 10 per cent of the total sales; 85 per cent of them are

directly operated), independent specialist retailers, department stores and a company-owned factory outlet:

- DOS mono-brand stores have a precise style characterization, in terms of store design, furniture, colours and service standards. The store personnel is directly employed by the company and is required to attend a training course in order to correctly communicate the company and brand image.
- Franchising stores present the same store design, style and image characterization as DOS stores; in contrast the personnel are independent from the company and therefore not necessarily trained to communicate the brand. Both DOS and franchising mono-brand stores have access to the whole product range and communicate sales data to the company via a shared information system.
- In contrast, department stores and specialist stores sell only the diffusion lines, with the exception of some selected retailers located in downtown areas of the international fashion capitals (such as Milan, Paris, New York), which can also access the luxury lines.
- Factory outlets are owned by the company and are mainly regarded as a way to minimize the losses due to unsold products.

The resulting supply chain configuration is depicted in Figure 6.7.

FIGURE 6.7 Parah: supply chain configuration



A portfolio approach for supply chain strategy in the fashion industry: the 'segmentation tree'

Analysing the case studies introduced in the previous section, there are three main drivers affecting supply chain configuration and management choices: product, brand and channel.

Product structural characteristics are a driver for manufacturing outsourcing and delocalization decisions. For instance Fratelli Rossetti decided to keep in house manufacturing for those products requiring its traditional competences (ie formal men's shoes) while outsourcing manufacturing for products which could be better manufactured by other specialist firms (ie formal women's shoes). A similar decision pattern can be observed in Bric's example, in which case differences in the product also led to delocalization to low labour cost countries.

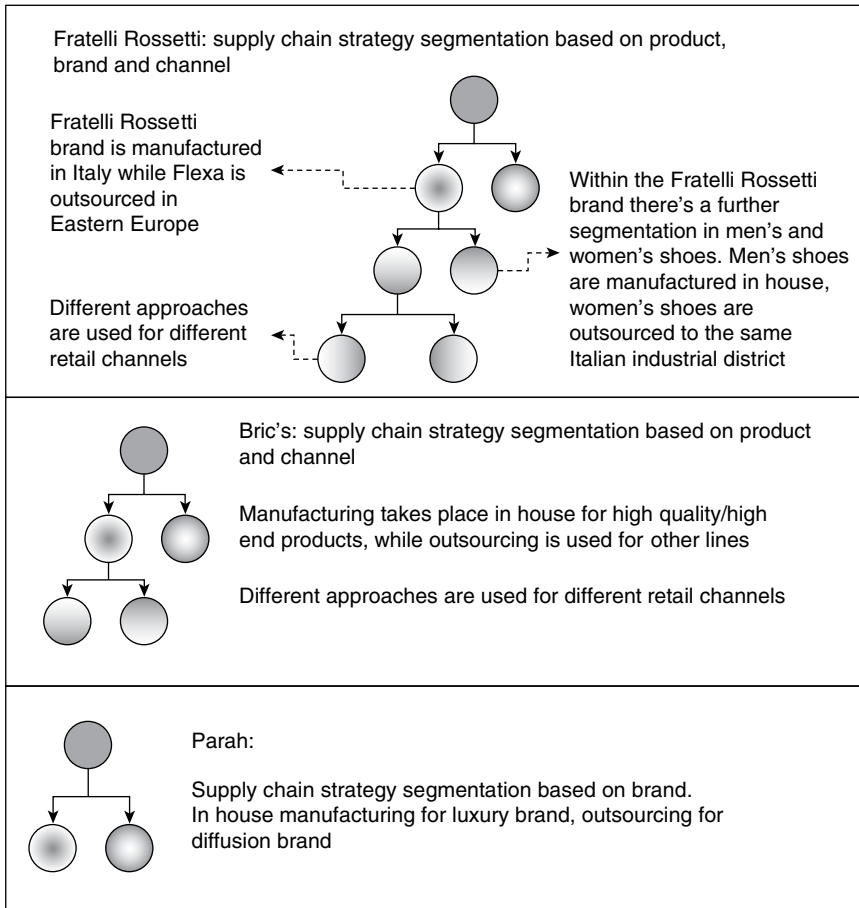
Brand positioning is a driver for delocalization decisions: this happens for both Fratelli Rossetti and Parah. Brand is also a driver for differentiating the distribution: an illustration is provided by Parah, which sells its luxury branded items exclusively in its direct operated stores.

Retail channel (as it can be expected) is a driver for segmenting the distribution approach: indeed Fratelli Rossetti and Bric's share demand and inventory information with their direct-operated stores and give them priority in terms of access to the whole product range and delivery performances. Distribution best practices – which can turn into a source of advantage – are IT integration, visibility between companies and data exchange, eg Bric's shares information with selected specialist retailers with whom it has long-term loyal relationships.

The three cases, and in particular the one of Fratelli Rossetti, provide some insights in terms of a possible relevance hierarchy between the three proposed drivers for supply chain strategy segmentation. Indeed, it seems that the principal segmentation driver (at least in the upstream part of the supply chain, ie manufacturing) is brand, which indeed affects the choice for delocalization: Fratelli Rossetti (luxury positioning) is to be manufactured in Italy, while Flexa (diffusion positioning) can be manufactured in low labour cost countries. Secondly, a further segmentation is made among different products within the same Fratelli Rossetti brand, ie women's shoes are outsourced to specialist firms in order to ensure excellent quality: so product appears to be the second driver for supply chain strategy segmentation. Brand seems to be the main supply chain segmentation driver also on the downstream side of the supply chain: indeed franchising and direct-operated stores, characterized by strong identification with the company's brand, can access the whole collection and have a direct relationship with the company. A further distinction is then made within the mono-brand stores: the product mix for the DOS is planned by the company and replenishment is allowed. This indicates channel as the second driver for supply chain strategy

segmentation on the downstream side of the supply chain. The resulting 'segmentation tree' in the three case studies is depicted in Figure 6.8.

FIGURE 6.8 Segmentation tree of the supply chain strategy in the three case studies

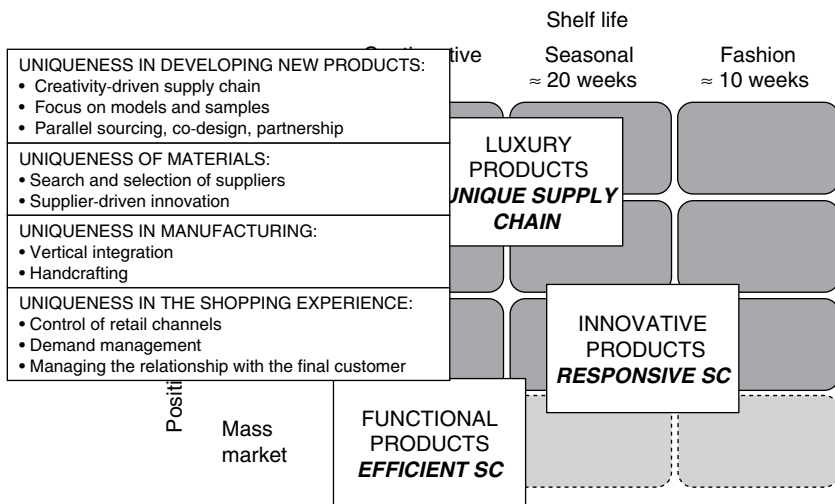


Conclusion

Evidence emerging from pages 134–42, as well as the results of the research of Caniato *et al* (2011) confirm the idea that, when dealing with the luxury segment of the fashion industry, the best supply chain strategy model is hardly identifiable. Most of the fashion-luxury actors have very specific and unique features that often coincide with the key drivers for success on the market.

Hence, the best takeaway for a supply chain manager of a luxury fashion company would be to consider suggestions from the literature, yet mixing and matching them into a unique supply chain strategy model according to the very specific features of the company (as depicted in Figure 6.9). The overall strategy might then be used as a blueprint and spawn a number of specific operative policies, according to a ‘segmentation tree’, to cater for the idiosyncrasies of the different *brands*, *products* and *channels* managed by the company (*brand* might be used as the main segmentation driver). Finally, the supply chain manager should also be sure to adapt such a set of strategies, in time, coherently with the brand(s) evolution.

FIGURE 6.9 A ‘unique’, bespoke supply chain strategy for luxury fashion items and brands



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Tesco's supply chain management

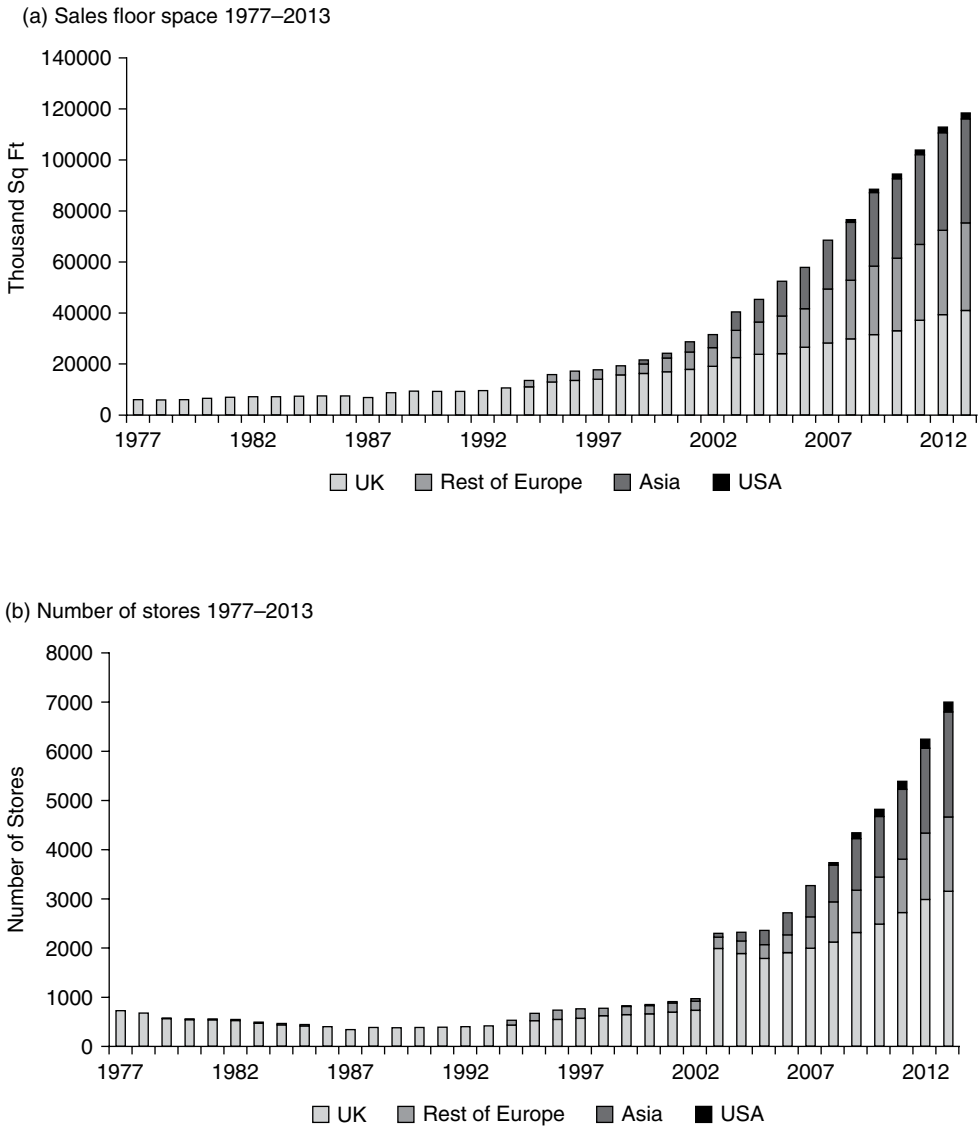
Leigh Sparks

Introduction

The transformation of Tesco in the last 35 or so years is one of the more remarkable stories in British retailing (Seth and Randall, 1999, 2005; Ryle, 2013). From being a comparatively limited 'pile it high, sell it cheap' down-market retailer, the company has become one of the world's leading retail businesses. Tesco are dominant in their home market (Burt and Sparks, 2003) and significant on the international stage. More than 65 per cent of Tesco's store floorspace is now located outside the United Kingdom, with the proportion of international stores (53 per cent), international sales (33 per cent) and international profit (34 per cent) growing rapidly (Figure 7.1). Its loyalty card and e-commerce operations are generally considered to be world-leading (Humby *et al*, 2003).

Some of those involved have provided accounts of this transformation (Powell, 1991; MacLaurin, 1999; Leahy, 2012; Ryle, 2013). Some aspects of the Tesco operations have been discussed publicly by their executives (eg Mason, 1998; Kelly, 2000; Jones, 2001; Jones and Clarke, 2002; Child, 2002). Tesco is also the focus of considerable academic attention (eg Burt and Sparks, 2003; Reynolds, 2004; Bevan, 2005; Palmer, 2004, 2005; Coe and Lee, 2006, 2013; Dawson *et al*, 2006; Sparks, 2008; Lowe and Wrigley, 2009, 2010; Lowe *et al*, 2012). This literature emphasizes the fundamental transformation of the retail business to meet changing consumer demands and global opportunities.

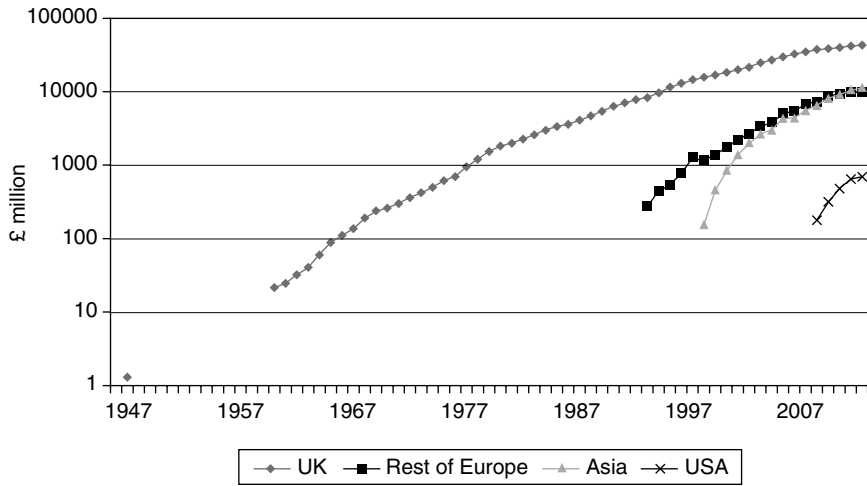
The visible component of this transformation is seen in the locations and formats of the retail outlets and in the range of products and services that the company offers. Customers are also aware of the changes through the constant reinforcement of the corporate brand. Less visible, however, is the

FIGURE 7.1 Tesco plc: an international business

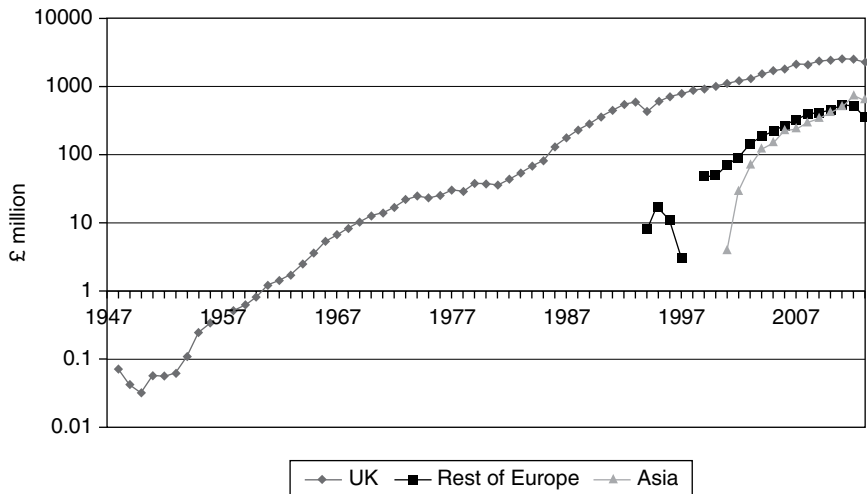
supply chain transformation that has underpinned this retail success story. It should be obvious that the supply chain required to deliver a small range of comparatively simple products to numerous small, high street stores in the 1970s is vastly different to the supply chain delivering the extensive breadth of food and non-food products in a modern Tesco Extra hypermarket and the availability levels required to run modern Tesco Express convenience stores and online shopping via Tesco.com and Tesco Direct. Some academic

FIGURE 7.1 *Continued*

(c) Turnover 1947–2013



(d) Pre-tax profit 1947–2013



analysis of this supply chain and logistics transformation is available (Sparks, 1986; Smith and Sparks, 1993, 2004, 2009a; Smith, 1998, 2006; Gustafsson *et al*, 2006).

This chapter presents a summary of the supply chain transformation in Tesco, and aims to describe, analyse and draw lessons from the journey Tesco has undertaken.

The changing Tesco supply chain: establishing control and delivering efficiency

The current retail position of Tesco is far removed from the origins of the company. Tesco made its name by the operation of a 'pile it high, sell it cheap' approach to food retailing (Sparks, 2008; Ryle, 2013). Price competitiveness was critical to this and fitted well with the consumer requirements of the time. The company and its store managers were essentially individual entrepreneurs. The growth of the company saw considerable expansion until, by the early 1970s, Tesco had 800 stores across England and Wales. This entrepreneurial approach to retailing, epitomized by the company founder Sir Jack Cohen, was put under pressure, however, as competition and consumer requirements evolved (Corina, 1971; Powell, 1991). Tesco had therefore to change.

The emblematic event signifying the beginning of this transformation was Operation Checkout in 1977 (Akehurst, 1984). Dramatically, all shops were closed for four days, trading stamps were removed, stores re-merchandized and prices were cut nationally as a grand statement. The business received an immediate and considerable boost to volume as consumers began to see a different approach to Tesco retailing. After this initial re-positioning event and phase, Tesco began to better understand its customers, control its business and to move away from its down-market image (Powell, 1991). This retail transformation, however, brought into sharp focus the quality and capability of Tesco supply systems and its relationships with suppliers.

Such concerns have remained fundamental during the subsequent rise of Tesco. By moving away from its origins, Tesco changed its business. Initially, the focus was on conforming out-of-town superstores, but since the early 1990s a multi-format approach has developed, encompassing hypermarkets, superstores, supermarkets, city centre stores and convenience operations. Online and multi-channel retailing has become a core activity. The Tesco corporate brand has been strongly developed (Burt and Sparks, 2002) and international ambitions have accelerated (Dawson *et al*, 2006; Lowe and Wrigley, 2009). In all this, the supply of appropriate products to the stores and customers has been fundamental.

Within the United Kingdom five main phases in distribution and supply chain strategy and operations can be identified. First, there was a period dominated by direct delivery by the supplier to the retail shops. Second, there was the move, starting after Operation Checkout, to centralized regional distribution centres (RDCs) for ambient goods. Third, a composite distribution strategy emerged from the late 1980s. Fourth, from the late 1990s there was a focus on vertical collaboration and integration through an emphasis on a 'lean' approach to supply chains, resulting among other things in 'stockless' distribution. Fifth, there has been an emerging focus on meeting the online and environmental challenges for supply chains.

Direct to store delivery

Up to and including the mid-1970s, Tesco operated a direct to store delivery (DSD) process. Suppliers and manufacturers delivered directly to stores, almost as and when they chose. Store managers often operated their own relationships (Powell's 1991 'private enterprise', p 185) which made central control and standardization difficult to achieve. Product ranges, availability, quality and even prices were inconsistent. This DSD system, however, fell apart under the pressures of the volume increases of Operation Checkout.

As Powell (1991, p 184) comments, quoting Sir Ian Maclaurin:

Ultimately our business is about getting our goods to our stores in sufficient quantities to meet our customers' demands. Without being able to do that efficiently, we aren't in business, and Checkout stretched our resources to the limit. Eighty per cent of all our supplies were coming direct from manufacturers, and unless we'd sorted out our distribution problems there was a very real danger that we would have become a laughing stock for promoting cuts on lines that we couldn't even deliver. It was a close-run thing.

Powell continues:

How close is now a matter of legend: of outside suppliers having to wait for up to twenty-four hours to deliver at Tesco's centres; of stock checks being conducted in the open air; of Tesco's four obsolescent warehouses, and the company's transport fleet working to an around-the-clock, seven-day schedule. And as the problems lived off one another, and as customers waited for the emptied shelves to be refilled, so the tailback lengthened around the stores, delays of five to six hours becoming commonplace. Possibly for the first time in its history, the company recognized that it was as much in the business of distribution as of retailing.

The company survived the initial supply system consequences of the success of Operation Checkout by operational 'fire fighting'; while problems occurred from the huge product volume increase, meltdown was avoided. It was clear, however, that a total change in approach to supply and distribution would be needed as the new corporate business strategy took hold.

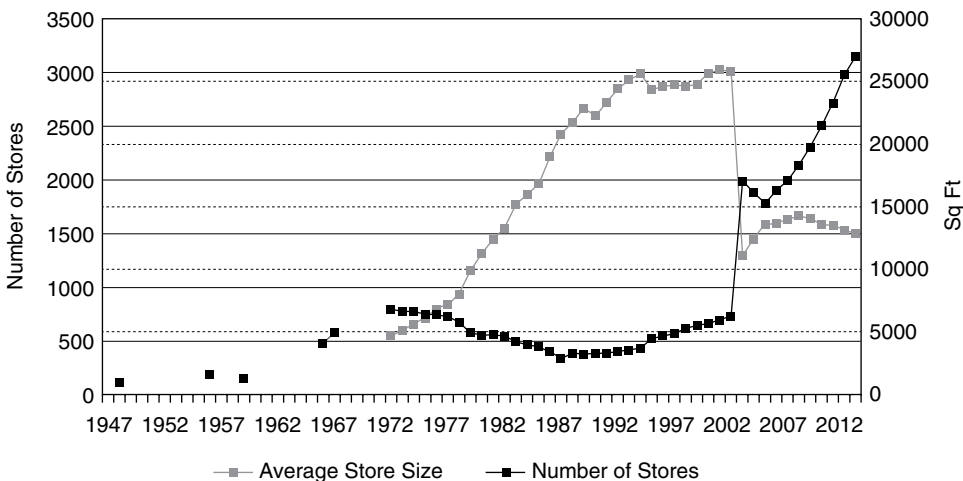
Centralization

The decision was taken to move away from DSD and to implement centralization. The basis of this decision (in 1980) was the realization of the critical nature of range control on the operations. Store managers could no longer be allowed to decide ranges and prices and to operate their own mini-empires. Concerns over the quality of product available to consumers in stores also suggested a need to relocate the power in the supply chain. If the company was to be transformed and modern customers better served, as the business strategy (focused on 'conforming' superstores) proposed, then head office needed control over ranging, pricing and stocking decisions. Centralization of distribution, to manage the supply of products into stores, was the tool to achieve this.

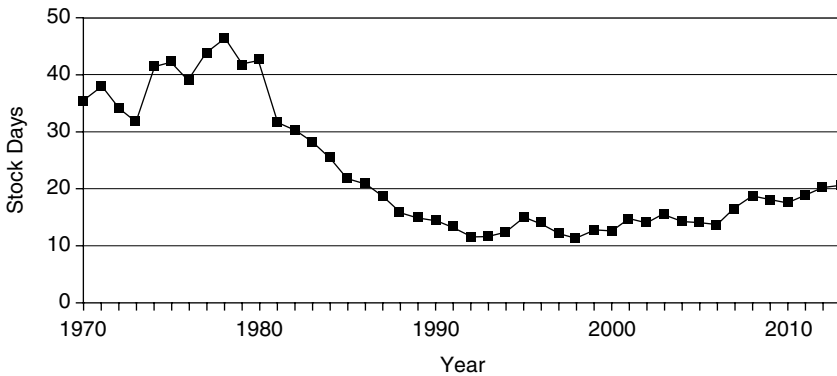
Tesco replaced DSD with a centrally controlled and physically centralized distribution network and service (Kirkwood, 1984a, 1984b) delivering the vast majority of stores' needs, utilizing common handling systems, with deliveries within a lead time of a maximum of 48 hours (Sparks, 1986). This involved a significant extension to the existing company distribution facilities and the building of new distribution centres (DCs), aligned more appropriately with the current and future store location profile. Investment in technology, handling systems and working practices allowed faster stock turn and better lead times. Components of the revised structure were outsourced, allowing comparisons among contractors and Tesco operated centres to compare practices and drive efficiency.

This strategy produced an organized network of centralized DCs, linked by computer to stores and head office. The proliferation of back-up stock-holding points and individual operations at store level was reduced. The introduction of centralization forced suppliers to meet Tesco's operational demands and gave Tesco control over the supply of products to stores. Suppliers were contracted to deliver into the distribution network and not direct to stores. These centres were the hubs of the supply network, being larger, handling more stock, more vehicles and requiring a more efficient organization. Centralization produced the necessary control over the business and fitted with the changed retail store strategy of the 1980s (larger 'conforming' out-of-town superstores). Figures 7.2 and 7.3 show the changing store profile and the impact of the distribution changes on corporate stock-holding. The immediate impact of centralization on stock holding is seen clearly in Figure 7.3.

FIGURE 7.2 Number of stores and average size of stores, Tesco PLC (UK only), 1947–2013



SOURCE: Tesco PLC, Annual Reports.

FIGURE 7.3 Inventory in Tesco PLC, 1970–2013

While stores saw some improvements in supply in the mid-1980s, there remained disadvantages of the centralized network. For example, each product group had different ordering systems. Individual store volumes were so low that delivery frequency was less than desired and quality suffered. Delivery frequency was maintained, but at the price of high vehicle empty-running costs and increased store receipt costs. It was expensive to have on-site Tesco quality control inspection at each location, which meant that the standards of quality desired could not be rigorously controlled at the point of distribution. It was also realized that this network would neither cope with the growth Tesco forecast in the 1990s nor, as importantly, would it be ready to meet anticipated higher legal standards on temperature control in the chill chain.

The produce depot at Aztec West in Bristol opened in 1986 and represented the best of the centralized network. Tesco could have made further investment in single-product distribution systems, upgraded the depots and transport temperature control and put in new computer systems, but this would still have achieved overall a less than optimal use of resources across the company and not been appropriate for the likely future requirements.

Composite distribution

It was recognized that an integrated approach to supply was required across the organization and that it could generate ongoing improvements. A strategy of composite distribution was thus planned in the 1980s to take full effect in the 1990s. A complication during this changeover was the need to ensure continuity of service to stores, made more difficult by the rapid growth and change in the business at this time (Figure 7.2). Composite distribution enabled temperature controlled product (chilled, fresh and frozen) to be distributed through one system of multi-temperature warehouses

and vehicles. Composite distribution used specially designed vehicles with temperature controlled compartments to deliver any combination of these products. It provided daily deliveries of these products at the appropriate temperature so that the products reached the customers at the stores at the peak of freshness. The insulated composite trailer could be sectioned into up to three independently controlled temperature chambers by means of movable bulkheads. The size of each chamber could be varied to match the volume to be transported at each temperature on each journey.

Composite distribution provided a number of benefits. Some derive from the original process of centralization and control, of which composite is an extension. Others are more directly attributable to the nature of composite. First, the move to daily deliveries of composite product groups to all stores in waves provided an opportunity to reduce the levels of stock held at the stores and indeed to reduce or obviate the need for storage facilities at store level. The result of this at store level is the better use of overall floor-space (more selling space) and greater in-store availability. For the company a continuous reduction in stock levels resulted (see Figure 7.3).

The second benefit was the improvement of quality and its consequent reduction in wastage. Products reach the store in a more desirable condition. Better forecasting systems minimize lost sales due to out-of-stocks. The introduction of computerized sales-based ordering produces more accurate store orders. More rigorous application of code control results in longer shelf life on delivery, which in turn enables a reduction in wastage. This is of crucial importance to shoppers who demand better quality and fresher products. In addition, however, the tight control over the chain enabled Tesco to satisfy and exceed new legislation requirements on food safety (see Smith and Sparks, 2009b).

Third, the introduction of composite provided an added benefit in productivity terms. The economies of scale and enhanced use of equipment provide greater efficiency and an improved distribution and supply service. Composite distribution required comparatively lower capital costs. Operationally, costs were also reduced through, for example, less congestion at the store. Throughout the system, an emphasis on maximizing productivity and efficiency of the operations, enabled by new computing and other technologies, also produced lower costs and better service levels.

The introduction of composite was, however, not a simple procedure. Considerable problems were encountered requiring Tesco to work closely with suppliers and distribution operators to reorganize and develop new and altered practices (Smith, 2006). The move to composite led to the further centralization of more product groups, the reduction of stock holding, faster product movement along the channel, better information sharing, the reduction of order lead times and stronger code control for critical products. Such changes are easy to list but hard to implement and achieve, and required close working with, and changed behaviours of, a variety of supply partners (Smith, 2006).

Issues remained post-composite implementation. Composite provided control over one part of the supply chain, but other parts remained untouched. For example, the cost of primary distribution (ie from production to composite centre) remained within the buyer's gross margin and was not identified clearly and separately. This cost had to be substantiated indirectly by talking to suppliers and hauliers. In other words, clarity and transparency was not achieved. As importantly, certain sectors of the supplier base were fragmented and not fully organized for the needs of retail distribution, despite the concomitant growth and development of Tesco retail brand products. Fragmentation made the task of securing further permanent improvements difficult. While some suppliers could re-organize their procedures to meet the changed demands of composite, others could not. This had implications for the scale and scope of the supplier base. Tesco themselves were interested in rationalizing the supplier base to improve efficiency and consistency of performance among other benefits.

This composite structure became the backbone of the supply network, although it too continued to evolve. For example, in order to increase the volume capability of the composites, Tesco later implemented a change to its frozen distribution strategy by commissioning a new automated frozen DC at Daventry. This national frozen centre delivered to Tesco stores by routing through the composite DCs. This enabled the composite frozen chambers to be converted to chill chambers, thus releasing extra volume capability to service Tesco business growth. The 'true' composite nature of the centres has been replaced as the scale and balance of the business and operational policies and capabilities have altered. Essentially they have been affected by new methods of working and become RDCs. As these changes took place Tesco realized they both needed and could develop expertise in DC operations, and thus took many of the activities in-house and away from subcontractors and logistics service providers.

Vertical collaboration and 'lean' supply chains

Despite the successes of the reconfiguration of the Tesco supply chain in the 1980s and 1990s, analysis of the supply channel pointed to a number of areas where benefits could still be achieved (Jones and Clarke, 2002). In a much quoted example, a can of cola was followed in the supply chain from a mine (for the can) to the store. It was discovered that it took 319 days to go through the entire chain during which time only two hours was spent making and filling the can. This process involved many locations, firms and trips (Jones and Clarke, 2002; Jones, 2002). As Jones and Clarke (2002) note, 'even in the best-run value streams there are lots of opportunities for improvement' (p 31). The implications for, and changes in, aligning the supply chain consequent on the learning from the can example are summarized in Figure 7.4.

FIGURE 7.4 The implications of the Tesco cola can journey

It was realised that practically all of Tesco's practices for getting goods from the supplier to the shelf would need to change.

The first step was to hook the point-of-sale data in the store directly to a shipping decision in Tesco's RDC. This made the end customer at the checkout point the 'pace-maker' regulating the provision stream. Tesco then increased the frequency of deliveries to the retail stores. After several years of experimentation, Tesco's trucks now leave the RDCs for each store every few hours around the clock, carrying an amount of cola proportional to what was sold in the last few hours. At the RDC, cola is now received directly from the supplier's bottling plant in wheeled dollies. They are rolled directly from the supplier into the delivery truck to the stores. And once at the stores, the dollies are rolled directly to the point of sale, where they take the place of the usual sales racks. This innovation eliminates several 'touches', in which employees moved cola from large pallets to roll cages, to the stores, and then onto dollies to reach the shelves, where they were handled one last time. (In drawing their provision-stream maps of the original process, Tesco discovered that half its costs in operating this provision stream was the labour required to fill the shelves in the store.)

For fast-moving products like cola, the Tesco RDC is now a cross-dock rather than a warehouse, with goods from suppliers spending only a few hours between their receipt and their dispatch to the stores. To guard against sudden spikes in demand, a buffer stock of full dollies is still held aside. But because of the frequency of replenishment, the buffer is very small. Back at the cola supplier, even larger changes have taken place. Britvic improved the flexibility of its filling lines so it can now make what the customer has just requested in small batches with very high reliability. This means that there are practically no finished goods awaiting shipment in Britvic's filling plant. The final logistics step is for Tesco's delivery truck to take the dollies several times a day from the RDC on a 'milk run' to a series of Tesco stores. At each store it collects the empty dollies and then visits several suppliers to return them. At each stop it also picks up full dollies and then returns to the Tesco RDC to restart the cycle. That may sound like a good way to increase truck miles and logistics costs, and many traditional managers, including those at Tesco and Britvic, have assumed it must. However, in practice, these methods substantially reduce the total miles driven along with freight costs, while also reducing total inventories in the system.

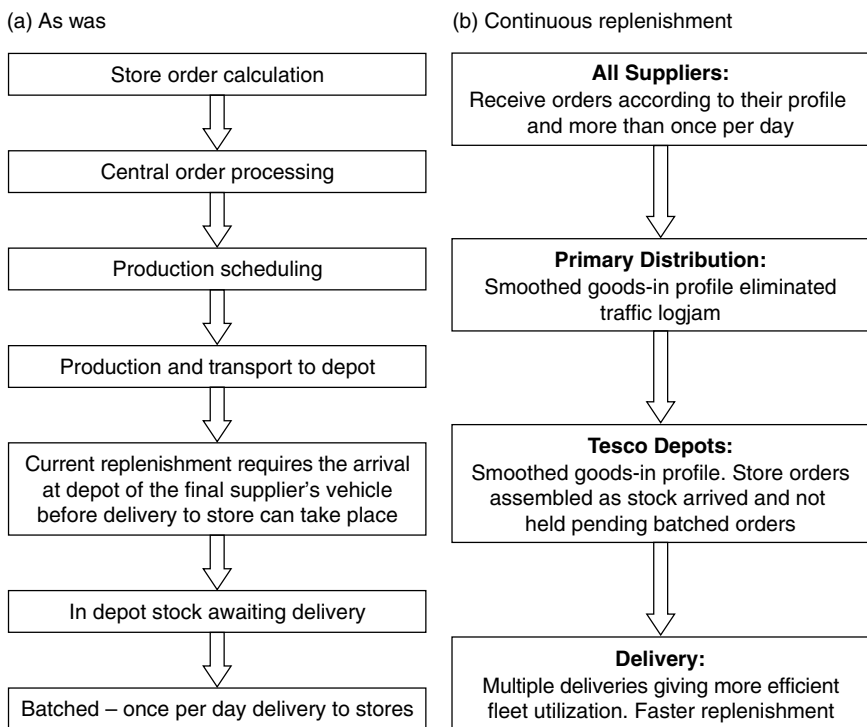
The consequence, in terms of performance, is remarkable. Total 'touches' on the product (each of which involves costly human effort) have been reduced from 150 to 50. The total throughput time, from the filling line at the supplier to the customer leaving the store with the cola, has declined from 20 days to five days. The number of inventory stocking points has been reduced from five to two (the small buffer in the RDC and the roller racks in the store), and the supplier's DC for the items has disappeared.

SOURCE: Fortune November 14, 2005, Womack and Jones (2005), pp 110–17 and 141–42.

The can example is one illustration of a broader process undertaken by Tesco (Jones and Clarke, 2002; Womack and Jones, 2005). The first step involved the mapping of the traditional value stream. This mapping process demonstrated its stop-start-stop nature. Secondly, and consequently therefore, value streams that 'flowed' were created/designed (Figure 7.5 is a diagrammatic simplification of 'before and after'). Thirdly (and as Figure 7.4 suggests) arising from flow principles, Tesco began to look at synchronization and aspects of lean manufacturing and supply. Finally, Tesco utilized its consumer knowledge from its loyalty card to rethink what products and services should be located where in the value stream (Humby *et al*, 2003). Jones and Clarke (2002) describe this process as the creation of a 'customer-driven supply chain'; others might use the term 'demand chain'. The effect is to meet consumer demands timeously at a local level and through whatever retail format the consumer requires.

Clarke (2002) summarized the supply chain projects of the early 2000s in Tesco that effectively comprised a movement to a 'lean' supply system (and are implicit in Figure 7.4).

FIGURE 7.5 The change to replenishment



Continuous replenishment (CR)

CR was introduced in 1999 and has two key features: first, a replacement of batch data processing with a flow system and second, using the flow system, multiple daily orders are sent to suppliers allowing for multiple deliveries, reducing stockholding through cross-docking and varying availability and quality.

In-store range management

Based on customer behaviour data and stock-holding capacity analysis at store, Tesco produce store specific planograms and store specific ranging. The system improves store presentation as well as stock replenishment and availability. Tesco provides the exact stock requirement for specific shelves in specific stores to its out-replenishment system.

Network management

Network management integrates and maintains the network assets and extends the life of the system. New sites add to the capacity of the system. Cross-docking is used at regional centres for frozen and slow-moving lines. Consolidation centres provide fresh produce for cross-docking. These changes have produced a more integrated network which has made better use of the assets, extended the life of centres and improved performance by selecting the right 'value stream' for appropriate products.

Flow-through

Flow-through or cross-docking is now more extensive. Product storage is much reduced. Increasingly DCs have no racking and do not store product. They are essentially 'stockless'. Pick-by-store practices have been replaced by pick-by-line processes in many instances. A different but nonetheless important aspect of flow-through is the use of merchandizable-ready units to allow product to be put on sale in stores without extra handling. Such units are increasingly common in fast-moving items, but can be used for many other items as well. More recently, retail-ready packaging and store-ready merchandizing have extended these principles and become increasingly important.

Primary distribution

Primary distribution is the term Tesco prefer for Factory Gate Pricing, seeing the process as a 'strategic change in the way goods flow... (and about) achieving efficient flows and not a pricing process' (Wild, quoted in Rowat, 2003, p 48). However, cost reduction is a key driver behind the interest in primary distribution. Essentially, primary distribution is about control (and pricing) of the supply chain from the supplier despatch bay to the goods in bay of the RDC. It separates out the cost of transportation from the purchase price of the product itself, and by putting it into a separate primary distribution budget, allows direct control and analysis by Tesco. Suppliers, and their

transport service providers, went through quite major changes to their arrangements for the delivery of their goods to the retail DCs (Smith, 2006; Gustafsson *et al*, 2006). Simons and Taylor (2007) provide an example of how these elements come together and emphasize the benefits for the chain as a whole in thinking about value chain analysis, working with close partners and focusing on the chain rather than sub-sets of the chain. The process is complicated and requires commitment but the benefits are clear. Tesco's vision for primary distribution is an in-bound supply chain which is visible, low-cost, efficient and effective, and has involved extensive development of backhauling.

Since these developments commencing in the early 2000s, the focus has been on improving the performance of the system as a whole, as well as specific components. Potter and Disney (2010) provide an example of algorithmic changes to enhance system performance in product supply, but do note that for some product types, further improvement was not achievable. There have been ongoing alterations to the network of facilities themselves (eg a major import storage facility at Teesport opened in 2010), developments in the use of technology (eg radio frequency identification) and changes to systems. Opportunities in network use intensity, vehicle usage and productivity (McIlwhee, 2006; Focus, 2007) have been taken. At the store level focus on better ordering (including an automated regional weather forecasting input to orders), more rapid clearance of discounted and promotional lines, tighter in store monitoring of availability and improved stock-holding locations have enhanced performance. Similar developments in operational practice have occurred at DCs.

The supply chain in the era of the internet and environment concern

The focus of much of the work on lean supply chains inevitably concentrates on the issue of 'waste' in the broadest sense, and thus on resource reduction (Leahy, 2012). This opens up a concern with sustainable distribution and environmental issues, which has been one of two major change processes that have affected the retail sector in the 2000s. The other major issue affecting supply chains has been the rapid and continual rise of internet shopping and the need to rethink delivery mechanisms for consumers.

In 1995 Tesco conducted a home shopping pilot scheme at a single store. Customers could use a variety of methods to order, with these orders picked at the store by Tesco staff, and collected or delivered to the customer's home or drop-off point. This pilot was extended to 10 stores in 1997 and a store-based picking home delivery operation was expanded nationally from 1999. This store-based model was not the common approach adopted by competitors. Criticism of the approach was 'vitriolic' (Child, 2002). Jones (2001) in an interview with John Browett (then CEO of Tesco.com) points to three key elements of the decision to use store-picking. First, Tesco believed that warehouse picking schemes could not make money (eg Webvan – the biggest

failure in the dot.com bubble). Second, customers wanted the full range of products and analysis showed that Tesco needed the wide range to drive basket size. Third, geographic coverage from warehouses was insufficient. The alternative store-based picking model, however, provided substantial benefits in terms of range, speed of implementation and national coverage. It also leveraged existing resources more fully and allowed the supply network both to see the activity recurring and to capture this activity in existing processes of re-ordering and store delivery (in-store picking helps monitor on-shelf availability). At a local level, the key components included ensuring picking processes were efficiently based on store layouts and that home delivery by local vehicles was also efficient and effective.

The outcome of this has been the world's largest and most successful internet grocery operation (sales approaching £3 billion in 2013), offering national coverage through local stores and tied into the national product supply network. In 2007, Tesco began to pick out of a dedicated (tesco.com only) store in Croydon, London for some internet orders. Demand in this area could not be met from local store picking and so a dedicated store ('dark store') was developed. A small number of such stores (four in 2013, with plans for three more) have been developed in areas of high internet shopping density and where existing stores struggle to cope. In London, for example, 80 per cent of internet orders are met from 'dark store' locations. Within these 'dark stores', alterations to processes and picking approaches, allied to automation development, have provided substantial productivity enhancements.

Home delivery by internet ordering for food/grocery has been supplemented with an extensive internet presence offering a huge range of food and non-food products (now over 200,000 products). In 2006, Tesco launched a catalogue (Tesco Direct) aimed at non-food home shopping. Consumers place orders by phone or online and have them delivered to the home or made available for pick-up at the local store. Most recently, there has been rapid development in all aspects of multi-channel operations with a focus on allowing consumers to order products and to obtain them as and when they wish. Thus there has been an expansion of Click and Collect operations at stores allowing consumers to collect pre-booked completed orders. Virtual shopping walls, initially trialled in Korea at subway stations, have linked smartphones, virtual stores and home delivery or collection (eg at Gatwick Airport). There has been a rapid complication of the patterns of behaviour affecting supply chain operations and an increased need for supply chains to be focused on delivering final consumer requirements.

A second major issue has been the rising concern over the environment and the environmental impact of the supply chain. Some of this concern has been externally created and motivated, eg plastic bags, food miles, packaging waste, with food retailers acting as a 'lightning rod' for the topics. However, there is also internal business concern for the issues, as reducing waste and unnecessary elements in the supply chain provides commercial as well as ancillary other benefits. Thus, with the rising price of fuel and

other supply chain costs, reducing miles travelled to distribute the right products and providing more fully-loaded fuel-efficient vehicles and better driving practices makes commercial as well as environmental sense.

These aspects of environmental concern are manifest in Tesco in a variety of ways. At the consumer level there has been extensive development of recycling centres and initiatives. At the store level, recycling of materials has been common for many years and Tesco were a pioneer in many respects of resource reduction in handling systems (Gustafsson *et al*, 2006). Retail-ready packaging, dollies, plastic trays etc all reduce the need for single-use systems and focus on sustainability of supply systems. Specific initiatives in the United Kingdom have included the development of rail freight services with Eddie Stobart running from Daventry (England) to Scotland, Wales and the south of England and the use of the Manchester Ship Canal to move New World bulk wine containers from Liverpool to a Manchester bottling plant. In the home delivery part of the business, trials with fully electric, zero-emission home delivery vans have proved successful and are to be extended (with the electricity provided by green sources). These examples show some of the concerns and reactions, but can appear piecemeal if not part of a coordinated approach.

In May 2006 Tesco thus added a community dimension to its steering wheel, reflecting its emerging corporate responsibility dimension. This has encompassed a wide range of initiatives and developments, many focused on distribution given its significance to Tesco's carbon footprint. By 2013 these developments were integrated into a more structured and strategic approach (Tesco PLC, 2013). Aimed at using 'its scale for good', Tesco set out three big ambitions including to lead in reducing food waste globally. This ambition is focused on working with suppliers and customers to reduce waste in Tesco operations including stores and the supply chain. They have set an ambitious goal to be a zero carbon retailer by 2050. With 14 per cent of Tesco's operational carbon footprint accounted for by distribution, Tesco's 'F Plan' to reduce emissions (fewer cages/pallets, fewer trailers/containers, fewer miles and reduced fuel economy) has to deliver, hence for example in transport having better fill rates for vehicles, utilizing double-decker vehicles, reorganizing flows and looking at multi-modal operations. A Tesco Knowledge Hub provides space for the retailer and suppliers to share ideas and practice in the area of environmental concerns, including approaches to carbon reduction.

Today's Tesco supply chain mission thus seeks to 'collaborate with our suppliers to provide the best possible availability for our customers, while achieving optimum stockholding' (IGD, 2012). To do this in the United Kingdom they currently operate 32 depots (including four for Tesco Direct) delivering 2.2 billion cases and 0.1 billion single items per annum. These 32 depots are supported by 15 consolidation centres and four trunking stations. The transport fleet has over 2,000 vehicles using 4,600 trailers. The vast majority of the operation is in-house, though the consolidation centres and about 40 per cent of the transport volume are out-sourced. This

extensive network is data rich and visible to suppliers through Tesco Link and Tesco Connect.

The process of change outlined above has modernized Tesco's UK supply chain. As a consequence of this, lead times to stores and from suppliers have been cut radically and stock-holding reduced considerably (Figure 7.3), particularly to the mid-1990s. The service to the consumer has improved immeasurably. Some argue (eg Burt and Sparks, 2003) that the supply revolution was an integral, if not essential, component of the rise to dominance of Tesco in the United Kingdom. The Tesco supply chain simply out-competed the competition, a fact implicitly recognized by subsequent major re-developments of the supply systems of Asda and Sainsbury.

Coping with complexity

Massive progress has thus been made in reconfiguring the Tesco supply system. However, this progress has also been achieved at a time when Tesco had begun to move from being a standardized, conforming superstore-based, domestic-focused retailer to a multi-format, multi-sector, international operator. In essence, Tesco set out to meet consumer demands wherever, whenever, however and for whatever they could. In 1997, Tesco outlined a strategy based on four pillars: Tesco UK, Non-food, Retail Services and Internationalization. At that time Tesco was essentially a UK-based food retailer. Ten years later this strategy had produced a dominant retailer in the home market, a strong and growing proportion of sales in non-food, with extensive financial and other service operations and an organization with more international than UK floorspace. In transforming the organization and operations to this degree, a number of challenges in the supply chain have had to be met. These challenges included a fundamental change in the store format strategy in the United Kingdom and extensive internationalization. In turn, from 2007 many of the certainties on which these approaches were based have been questioned by the global recession.

Multi-format development

The development of Tesco Metro and Tesco Express stores in the early 1990s were the first steps towards a focus on the urban centre and convenience customers. The 1980s had been almost entirely focused on developing 'conforming' out-of-town superstores, but this approach was limiting in terms of the types of shopping trips that could be serviced. By re-entering high streets and locating Tesco Express stores as convenience outlets, Tesco began to capture those other shopping trips both from new and existing customers. As UK land-use planning tightened to reduce out-of-town opportunities so these different formats and locational types became more important. The convenience market in particular became a focus from 2002 when a major takeover dramatically increased the number of Tesco Express stores (Figure 7.2), presenting very different supply chain issues.

The present-day Tesco is a multi-format retailer with formats ranging from Extra hypermarkets to small Express convenience stores. This variation has been compounded by retail operational changes. Store opening hours have been extended in many locations to encompass 24-hour opening. Service levels and quality thresholds have been enhanced. Product ranges (including non-food), operating times and service standards all combined to pressurize a supply system that was essentially developed for a simpler, more standard situation.

The format development in the United Kingdom from the 1990s is detailed in Table 7.1. Two components of the table are noteworthy in a supply chain context. First, the scale and location of the formats obviously varies, posing challenges in supplying products to stores. Second, this is compounded in some situations by the extension of the product range into non-food. Thus there has been an extensive development of hypermarkets

TABLE 7.1 Tesco format development in the United Kingdom

Format/ Formula	Introduction year	Description	Number of stores in 2013	Store floorspace in 2013 (000 sq ft)
Hypermarket (Tesco Extra)	1996	Stores over c60K sq ft sales, offering food and non-food, often using mezzanine floors.	238	17,051
Superstore (Tesco)	n/a	Specialist food stores with some non-food, varying from c20–45K sq ft.	481	14,053
City Supermarket (Tesco Metro)	1992	Food specialists with extensive ranges of convenience foods, mainly high street locations.	192	2,145
Convenience Store (Tesco Express)	1995	Convenience focused stores in varying locations, but also on petrol station forecourts.	1,547	3,588

TABLE 7.1 *Continued*

Format/ Formula	Introduction year	Description	Number of stores in 2013	Store floorspace in 2013 (000 sq ft)
Convenience Store (One-stop)		Small convenience stores not suitable for conversion to Express stores after takeover in 2002.	639	991
E-retailing (Tesco.com)	1999	Internet ordering, store-based picking model. Home delivery or click and collect. Supplemented in major urban locations by 'dark stores'; internet picking only.	5	604
Catalogue retailing (Tesco Direct)	2006	Catalogue available in store for ordering over the web, phone or in store. Delivery direct to home or via collect at store.		
Non-food Stores (Tesco Homeplus)	2005	Stores of c30K sq ft offering wide range of non-food items.	12	523
Garden Centres (Dobbies)	2008	Large garden centres including restaurant, food hall and other concessions. Historic business (c1865) purchased in 2007/08.	32	1,540
TOTAL			3,146	40,495

often by extending existing stores, with the new space occupied by non-food products. At the same time smaller stores have emerged in rather more problematic locations for supply systems, eg busy urban high streets. As such, if Tesco had not been developing flow and other handling systems, then the potential for added complexity and cost would have been great. By using all the data and the network at their disposal, the variety of formats has been extended. The overall impact on the supply elements of the business has been managed, though inventory levels have risen (Figure 7.3) as complexity (internationalization, non-food, takeovers, multi-format, internet, catalogue) has increased from the mid-1990s.

Internationalization

Tesco's strategic store internationalization began in 1994 with entry into Hungary but soon expanded into other central European countries (see Table 7.2). First steps were then made into the Asian market, both as a reaction to the Asian economic crisis of the 1990s which meant assets were cheap, but also due to a more positive sense of the scale of the market opportunities in China and Japan for example. Internationalization has provided both

TABLE 7.2 Tesco international store operations

Country	Year of entry/exit	Comments	Number of stores in 2013	Store floorspace in 2013 (thousand sq ft)
Ireland	(a) 1978/1986	Tesco entered Ireland when it acquired stake in Albert	13 hypermarkets,	821
	(b) 1997	Gubay's Three Guys, gaining 100% control in 1979. Sold to H Williams in 1986. Re-entry to Ireland came when Power Supermarkets and Quinnsworth were bought from ABF.	129 other stores	2,635
France	1993/1998	Catteau's 92 stores were operated under their fascia before they were sold to Promodes. One Vin Plus alcohol store remains in France to capture British tourist spend.	1	0.02

TABLE 7.2 *Continued*

Country	Year of entry/exit	Comments	Number of stores in 2013	Store floorspace in 2013 (thousand sq ft)
Hungary	1994	Entered by buying a stake in Global, now wholly owned. Variety of formats now operated.	118 hypermarkets 98 other stores	6,753 576
Poland	1995	The Savia chain was purchased initially. HIT hypermarkets were bought in 2003 and 220 Leader Price stores from Casino in 2006. Variety of formats now operated. Online introduced.	82 hypermarkets 364 other stores	5,737 3,689
Czech Republic	1996	When K-Mart pulled out of Central Europe, Tesco took over the stores. Further stores were gained as part of an asset swap with Carrefour in 2005. Convenience format both owned and franchised. F&F standalone stores operated.	86 hypermarkets 148 other stores 142 franchises	4,627 1,324 141
Slovakia	1996	When K-Mart pulled out of Central Europe, Tesco took over the stores. Further stores were gained as part of an asset swap with Carrefour in 2005 and other acquisitions. Tesco International Clothing Business HQ.	62 hypermarkets 74 other stores	2,960 862
Thailand	1998	Tesco purchased a stake in Lotus (hypermarkets). Added Express format stores from 2002, followed by other formats, including internet grocery in Bangkok. Now wholly owned.	149 hypermarkets 1,284 other stores	10,709 3,611

TABLE 7.2 *Continued*

Country	Year of entry/exit	Comments	Number of stores in 2013	Store floorspace in 2013 (thousand sq ft)
South Korea	1999	A joint venture with Samsung has been used to develop and operate stores, including Aram Mart chain bought in 2005 and Homever in 2009. Online retailing launched and 22 virtual stores in subways/ bus stops. Homeplus is main large format.	133 hypermarkets 298 other stores 89 franchise stores	12,108 934 188
Taiwan	2000/2006	The Taiwan operation was sold to Carrefour as part of an asset swap in 2006, recognizing that it was not growing as desired.	–	–
Malaysia	2002	A joint venture with Sime Darby was set up to develop the stores. Took over Makro stores in 2007 and converted to Extra.	47 hypermarkets	3,918
Japan	2003/2012	A purchase of C-Two Network of Tokyo convenience stores marked entry, with Fre'c being added in 2004. Exited in 2012 having reached 121 small supermarket and convenience stores, totalling 0.4 m sq ft.	–	–
Turkey	2003	A stake in Kipa stores marked entry. 93% owned by Tesco, but operating under Kipa name. Digital Clubcard launched.	56 hypermarkets 135 other stores	3,351 602

TABLE 7.2 *Continued*

Country	Year of entry/exit	Comments	Number of stores in 2013	Store floorspace in 2013 (thousand sq ft)
China	2004	Entry came through Ting Caos Hymall hypermarket operation, which became 90% Tesco owned in 2006. Global sourcing HQ in Hong Kong. Internet home delivery launched in Shanghai. August 2013 – in talks with China Resource Enterprises to form joint venture, with possible removal of Tesco name from stores.	117 hypermarkets 14 other stores	10,165 31
USA	2007/2013	The first stores opened as Fresh&Easy Neighbourhood Markets in California and Nevada in late 2007. Struggled to make an impact and announced withdrawal in 2013 having reached 200 stores and 2 m sq ft.	–	–
India	2008	Has sourcing and Hindustan Service Centre operations and franchise agreement with Tata group (Trent – Star Bazaars) for expertise and product supply.	–	–
TOTALS			863 Hypermarkets 2,544 Other stores 231 Franchises 3,638 TOTAL	61,149 14,263 329 75,741

additional sales and markets for Tesco, but it has also brought opportunities to develop new concepts and approaches (Dawson *et al*, 2006; Coe and Lee, 2006, 2013) and to learn from experiences (Palmer, 2005). In central Europe, for example, variants of the hypermarket concept have been trialled and eventually transferred back to the United Kingdom in the form of the Tesco Extra concept. Experience in non-food gained in various countries, as well as the UK hypermarkets, has led to the non-food UK Tesco Homeplus stores. Versions of small format and discount focused stores are operating in central Europe and Asia (especially Poland and Thailand) and these may yet offer potential in the United Kingdom or elsewhere in the world. The entry to Japan provided the opportunity to learn about convenience stores in a very competitive urban market. The learning from this experience has been used to help the convenience and urban chains in the United Kingdom, and informed aspects of the 2007 entry into the United States (Lowe and Wrigley, 2009), which in itself has become a learning experience (Lowe and Wrigley, 2010; Lowe *et al*, 2012).

The strategic approach to store internationalization has seen Tesco develop different solutions for diverse markets, using distinct formats and tailoring the product and service offer to the local market. In many countries they operate as a multi-format and now multi-channel retailer and focus on the core values and brands of the business. Behind the scenes, people, processes and systems have been enhanced and rolled out initially as 'Tesco in a Box' and more recently as the Tesco Operating Model (McNamara, 2011). This provides all the necessary systems to operate key Tesco processes in any country and is supported by their Hindustan Service Centre in Bangalore, India. The impact of this strategic internationalization has been to turn Tesco from a company dominated by UK food superstore retailing to one where the sales floorspace outside the United Kingdom is greater than that inside the United Kingdom, store number growth has been focused internationally and profit and turnover growth has more generally been faster internationally than in the United Kingdom (Figure 7.1).

As can be readily understood, the internationalization of Tesco at store level brings supply chain issues as well. At the same time, Tesco buys products on a global basis and this also has to be 'fitted in' to the ever-changing pattern of supply and demand (Simister and Holmes, 2011). With formats and products varying by country and with time, the need is for a supply system that can be adaptable. In many cases, eg Ireland, Hungary and Turkey, the centralized composite model has been exported to these countries, often with the same logistics service partners. In other situations there is an attempt to rethink the supply system and the technology needed and use this as the platform moving forward. Internationalization has brought extensive network development to build the infrastructure for store development.

For example from 2003/04, based on the UK composite model, Tesco opened the largest DC in Asia at Mokchon, Korea. They also opened major centres in Poland and the Czech Republic, extended a centre in Hungary

(and added another fresh food DC) and developed a new composite site in Ireland. In 2007/08, Tesco opened new DCs in Thailand (for Express stores), and Malaysia and Japan (for fresh food products). More recently, a fresh DC was opened in Thailand and new centres opened in Poland (the largest DC in the country) and China (a low-carbon centre). There are now 12 DCs in the Asian operation, while in Central Europe there is a rationalization of centres underway from 22 to 10 with a focus on cross-border networking and integration. The approach is that of standardization, focusing on one platform and many markets, thus generating savings from learning previously and elsewhere.

Retail internationalization can be controversial due to its impacts on the existing retail structure. Tesco (among other retailers) has been criticized not only for its sourcing policies, but also for its impacts on small, local retailers in countries as far apart as Poland and Thailand. Internationalization has an impact on the supply systems of the countries in which retailers source and operate (see Reardon, 2005; Humphrey, 2007; Reardon *et al*, 2007; Muller *et al*, 2012 for a discussion of aspects of these issues). When Tesco introduce a new supply system and approach by importing their western European style model, practices and standards (and often some of their supply system partners), there are impacts on suppliers, manufacturers and other intermediaries. Coe and Hess (2005) in a study of such impacts in eastern Europe and east Asia identified five sets of ongoing restructuring dynamics: the centralization of procurement, logistical upgrading, supply network shortening and new intermediaries, the imposition of quasi-formal contracts and the development of private standards. They suggest that these processes are leading to an ongoing 'shakeout' of the supply base that is favouring relatively large, well-capitalized suppliers. In South Korea, the success of the Tesco operation has seen a huge growth in the local supply base and an expanded use of regional sourcing (Coe and Lee, 2013).

Jones (2002) put forward a variety of scenarios for grocery supply chains. All have at their heart a move away from the current system of bigger, centralized and dispersed to a model of faster, simpler and local. Such a system focuses on moving value creation towards consumers and eliminating non-value creation steps in supply. Information systems are simplified so as to avoid order amplification and distribution. The supply chain is thus compressed in space and time, producing and shipping closer to what is needed just in time. Some of these proposed practices have informed Tesco supply chain management in the United Kingdom and elsewhere, but nowhere as much as in their entry to the United States. Here, the opportunity was taken to develop a new format and to think afresh about the supply chain, along some of the lines outlined by Jones (2002), but combined with other learning on environmental concerns, technology and process development. This is obviously easier in a new entry setup than in transforming an existing large-scale operation.

In supply terms, the Tesco Fresh and Easy operation in the United States is a little different to other Tesco operations, partly because some practices and processes have been built up from scratch, and have used and informed core processes from the Tesco Operating Model (McNamara, 2011). Tesco introduced both 'follower-supplier' components, bringing leading UK suppliers to a co-production and distribution facility, and also an active engagement in a network of preferred suppliers, including smaller specialist suppliers (Lowe and Wrigley, 2010; Lowe *et al*, 2012). Co-located production facilities at the head office and distribution hub permit rapid response to demand (a manifestation of the predicted developments in the Tesco supply system – Jones, 2002; Jones and Clarke, 2002). While this is not unknown in, for example, Japan, the attempt here is to move towards a low-touch, lean operation and to rethink traditional approaches. There is extensive recycling of packaging, use of returnable crates and retail-ready merchandizing and packaging. The emphasis is on fully automated, one touch replenishment.

More generally, as Tesco has become larger and more international, both in store operations and product supply, so other developments have been introduced to develop efficient global supply chains (Simister and Holmes, 2011). These have focused on better supply chain cost modelling, trials on direct sourcing, regional consolidation of import supply chains, alignment of the network from suppliers to stores and harmonizing case configurations and raw material costs. In short, Tesco have had to find ways to manage and control increasing supply chain complexity, while seeking to benefit from their scale.

Global recession

From 2007 onwards, much of the Western world experienced a deep recession, with other countries affected to varying degrees. The global economy has been restricted and many businesses adversely affected. This has produced difficulties for retailers and has focused their attention on all aspects of their operations. For Tesco, the entry to the United States, with hindsight, took place at exactly the worst possible time. The western US economy suffered very badly and Fresh and Easy found it difficult to develop scale and performance; though the recession was not the only reason for their difficulties. As the global economy declined and stagnated so Tesco has withdrawn from Japan and the United States and is in discussion to reconfigure its presence in China (Table 7.2).

Within the United Kingdom, the economy has been in deep recession and business performance has been adversely affected. Tesco, since 2007, has been losing market share, albeit slowly, and while it remains the market leader by some way, performance has not been acceptable to the stock market or the Board. To some extent, the UK stores had been neglected during rapid

international expansion and they and the store network had not adapted enough to the realities of the recessionary changes in consumers and the impact of the internet. The company does now believe that they ran the stores 'too hot', ie too much focus on cost-efficiency and not enough on meeting consumer aspirations. Being 'too hot' included perhaps a 'too lean' supply system whereby too much emphasis was placed on internal business efficiency and not enough on what it ended up looking like to the consumer; especially when that consumer was behaving differently than before. In November 2012 a revitalization strategy was unveiled to refocus attention on consumer demands. This included a considerable emphasis on the new role of technology and delivering internet shopping, and signalled the 'end of the space race' in terms of large hypermarket stores, reflecting the new internet era dynamics in retailing (and thus in distribution). Symptomatic of this changed reality, Tesco have decided to close their Harlow DC as they open a new one in Dagenham. The previous plans had been to run them both, but a review in 2013 pointed to the changed consumer patterns and store requirements and thus the need for a 'nimble' network structure.

A more problematic aspect of the global recession became visible in early 2013 when the presence of horsemeat in a small number of products on sale in the United Kingdom, including at Tesco, was identified. The recession had provided a ready supply of cheap horsemeat and this was substituted for beef in some processed products. This scandal revealed a lack of visibility, traceability and control over an extended meat supply chain and an over-reliance on contractual agreements subject to inadequate auditing and testing. This was despite previous indications that this was not the case (see Lindgreen and Hingley, 2003) and highlighted gaps in some supplier relationships and between rhetoric and reality in some product supply systems, especially for cheaper processed products produced internationally. The reaction in business terms has been to focus on more visible and shorter product supply systems and an enhanced focus on traceability, localism and inspection regimes.

Conclusion and lessons

This chapter aimed to understand and account for the changes in supply chains by examining changes in the Tesco supply chain management. The basic premise was that the transformation of retailing that the consumer sees at store level has been supported by a fundamental transformation of supply chain methods and practices. In particular, there has been an increase in the status and professionalism in supply chains as the time, costs and implications of the functions have been recognized. Professionalism has been enhanced by the transformation of supply chains through the application of modern methods and approaches. For all retailers, the importance of managing supply chains is now undeniable. As retailers have responded

to consumer change, so the need to improve the quality and appropriateness of supply systems has become paramount (Sparks, 2010). As the impacts of supply chains on businesses and the wider environment come under more intensive scrutiny, so performance management from all perspectives including consumers' will become more vital.

The Tesco study demonstrates many aspects of this transformation. In response to a clear business strategy its supply chain has been reorganized and realigned. From a state of decentralization and lack of control, Tesco has moved through centralization and composites which enabled strong control to be exercised. These in turn have led to new methods and relationships in supply systems, both within Tesco and throughout the supply chain, recognizing the benefits of coordination and integration and a focus on lean and flow processes. Supply chains do not stand still and recognition of the need to think clearly about supply pervades the chapter. The developments outlined here and the transformation described via Tesco are not permanent solutions. Nowhere is this seen more clearly than in the rapid development of internet and multichannel retail and distribution. As consumers change their needs, so retailing must and will respond. As retailing responds, companies will modify their operations, not least their supply systems, or be placed at a competitive disadvantage. As society and economy change priorities, so too retailers have to respond and recognize their impacts on, for example, the environment. In many cases companies can benefit from a closer study of their practices and impacts in this regard, as there are opportunities to save resources and money, as well as time.

So what are the lessons from Tesco?

In many ways Tesco is all about control. The case demonstrates that in order to meet modern consumer needs retailers have to be in control of their operations including the supply of products. This does not mean that the retailer has to undertake every activity, but it does mean they need to know all about it, manage and organize it and ensure its appropriateness. Inevitably this requires considerable collaboration with partners, service providers and suppliers. Through this collaboration, the flow and pace of the supply of products can be controlled and smoothed such as to reduce the effort and expense involved. In the best cases, service rises and costs fall as supply chain orientation takes hold. This 'best case' scenario is inevitably the result of an informed supply chain and the capture of data and its use as information in the supply system is vital. Finally, Tesco recognize that supply chains do not stand still. In a dynamic consumer market with changing demands and business strategies (eg internationalization, internet, sustainability) there is no way in which the supply chain can remain static. Supply needs to be adaptable to ongoing changes in demand, but also requires constant strategic consideration about the value being added or taken away from the business. Environmental concerns and technology developments severely challenge existing practices and make supply chain change inevitable into the future. This is taking place at a global level as well as national and local levels.

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On-shelf availability in UK retailing

John Fernie and David B Grant

Introduction

In their major international study of retail out-of-stocks (OOS), Corsten and Gruen argued that ‘availability of products is the new battleground in the fast moving consumer goods industry’ (2003, p 603). The study of stock-outs is not new; in the United States the *Progressive Grocer* published the first major study on how grocery customers reacted to stock-outs (1968a, b) and Schary and Christopher’s 1979 study of grocery customers in London revealed that a high proportion of customers (48 per cent) chose to shop elsewhere when faced with a stock-out.

In the intervening years the grocery retail industry has been transformed, especially in the United Kingdom. At the time of the Schary and Christopher study manufacturers’ brands dominated the shelves of a fragmented retail industry. If consumers could not find their favourite brands in one store, a competitor would be able to provide it in a nearby location. Over 30 years later the rise of retail grocery giants, such as Tesco with over 30 per cent of the UK grocery market, has led to a retail-controlled supply chain and the predominance of retailer, rather than manufacturer brands.

Accessibility is now measured in driving times to superstores rather than short trips between butchers, bakers, fishmongers and supermarkets in the high street. Store loyalty has become as important, if not more important, than brand loyalty as evidenced by the largest grocers’ ventures into non-grocery areas such as banking and other service-related sectors under their corporate brand umbrella.

In order to improve operational efficiencies UK grocery retailers streamlined their supply chains. From centralization of distribution in the 1980s companies began to integrate primary and secondary distribution to reduce

lead times and take inventory out of the retail supply chain. Fernie and Sparks (2004) claimed that the United Kingdom had one of the most efficient supply chains in the world in the 1990s/early 2000s.

Despite these logistical innovations, on-shelf availability (OSA) was deemed to be a major cause of concern for British consumers (Efficient Consumer Response (ECR) UK, 2004) and media attention focused upon J Sainsbury when the *Sunday Times* published a report indicating that in a 30 item shopping basket, on average Sainsbury had 10 per cent OOS with the worst performing store only having two-thirds of items available (Fletcher, 2004). It was around this time that Justin King was appointed as Chief Executive of J Sainsbury and he set out an agenda to 'Make Sainsbury's great again'. He undertook market research with Sainsbury customers and found that their greatest source of dissatisfaction was out of stocks (OOS). Zentes *et al* (2007) provide a detailed discussion of Sainsbury's problems as a case study in their book.

However, this pattern was being repeated throughout the grocery sector and had become the focus of attention for ECR UK and IGD, formerly the Institute of Grocery Distribution; the main UK trade associations for addressing issues pertaining to the sector. In the previous edition of this book, the authors focused upon how one major UK grocery company initiated OSA initiatives from its headquarters and showed how the policy was implemented with some success at distribution centre (DC) and store level. Since then, we have carried out further research at product category level in grocery and also in the non-food sector, especially in the clothing industry. The purpose of this chapter is therefore to give an overview of the OOS/OSA problem across sectors to identify consumer reactions to stock-outs, the causes of retail OOS, measures taken to improve OSA prior to providing a model to aid managers to address this important issue.

Consumer reaction to stock-outs

Research into consumer reactions to stock-outs spans four decades and these studies identify five main reactions by consumers to a stock-out in store:

- 1 they buy the item at another store (store switching);
- 2 they delay ordering or purchasing the item (postpone purchase at the same store);
- 3 they do not purchase the item (a lost sale);
- 4 they substitute the same brand (different size or type);
- 5 they substitute for another brand (brand switching).

Research by IGD (2003) shows that 65 per cent of UK consumers looking for a specific grocery item will adopt one of the first three reactions, thus

not buying in that particular store on that occasion if a stock-out occurs. In 1979, the figure from the Schary and Christopher study was 78 per cent. Despite the retail changes that have occurred since 1979, the degree of store switching is remarkably high for a sector that prides itself on customer loyalty programmes! Compared with the more general results of Corsten and Gruen (2003) the figure for the United Kingdom is high compared with other markets where the average is 31 per cent.

Many studies discuss in-depth the causal factors that prompt consumer reactions to stock-outs such as the product category, the nature of the brand loyalty, consumer type and the immediacy of need (Emmelhainz *et al*, 1991; Verbeke *et al*, 1998; Gruen *et al*, 2002; Sloots *et al*, 2005). The latter work not only investigated brand equity/loyalty but also the hedonic value of products. Thus, customers who possess high brand equity/high hedonic values on a product are likely to switch brands or stores to acquire the product. Further, they will do so without serious consideration of their own 'personal logistics costs' or paying to have their groceries delivered by the retailer (Teller *et al*, 2006).

Campo *et al* (2000) identified three drivers that influence consumer reactions. They are the opportunity cost of not being able to consume immediately, the substitution cost of using a less preferred product or brand, and the transaction cost of the time required to acquire the invaluable item. Corsten and Gruen (2003) showed that consumers switch more in some categories rather than others, especially with brands that do not have a personal attachment associated with them. For example, they found more substitution occurred with paper towels compared with feminine hygiene products.

Academic research on customer reactions has been reinforced by reports from trade organizations. ECR UK have held conferences, seminars and written influential reports on the topic. In addition to the three factors identified by Campo *et al* (2000, 2003), ECR UK (2004) discussed the profile of shoppers and noted that consumers tended to perceive OOS to be higher in promotional rather than non-promotional items.

Similarly, IGD's main logistics conference in 2004 focused upon this theme and commissioned research, published in 2005, on consumers' responses to stock-outs in three different product categories – health and beauty, frozen food and dairy products. Similar results were found in Corsten and Gruen's survey where OOS in health and beauty products led to consumers shopping in other stores since substitution was more likely to occur in the other categories due to the immediacy effect.

Only one paper, Zinn and Liu (2008), has dealt with a consumer's response to a stock-out in a clothing environment. In a US-sponsored survey by an apparel retailer, they assessed the initial response by customers to a stock-out of jeans and trousers and then did a follow-up survey to match actual versus intended behaviours. Using the categorizations of delay, leave and go to a competitor or leave and quit, Zinn and Liu noted that there was a major change between intended and actual behaviour, especially

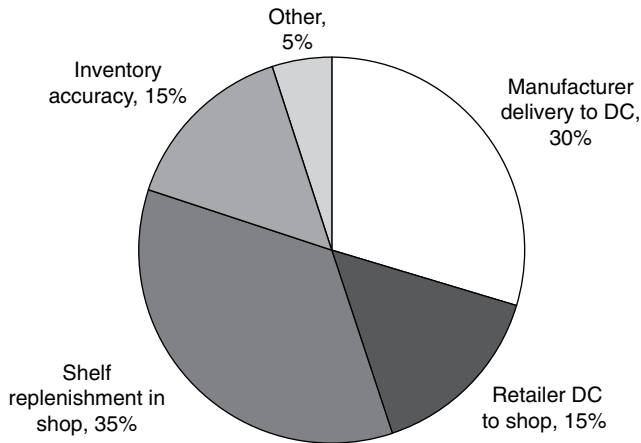
with respect to delay (decreased by 30 per cent) and leave and quit (increased by 300 per cent). The main reasons for such behaviours related to product uniqueness, a pre-planned agenda for the shopping trip and store loyalty. If a consumer had a clear intention of buying a particular item and it was not available, it was more likely that the consumer would leave and purchase at a competitor's store. As store loyalty was an important factor it was important for store staff to try and influence customer choice by offering a substitute product or guaranteeing the item would be available as soon as possible in store.

The causes of retail OOS

Aastrup and Kotzab (2010) reviewed 40 years of research into OOS/OSA dividing consumer reactions to a stock-out as the demand side of the issue and the supply side to the tackling of the causes of OOS/OSA. They commented that after studies by *Progressive Grocer* in 1968 there was a 30-year lull before the worldwide study undertaken by Corsten and Gruen (2003) that led to initiatives by ECR Europe and its country affiliates to investigate the root causes of OOS and methods to improve OSA and reduce OOS. The Corsten and Gruen (2003) research indicates that most OOS situations occur at the store level, primarily through ordering and replenishment practices. However, they did point out that the problem of replenishment from within store was more important in their work than findings from the Coca Cola Research Council/Andersen Consulting (1996). Replenishment within store became a key issue for UK grocery retailers in the early 2000s and is known as the 'last 50 yards' problem. Figure 8.1 shows that 35 per cent of OOS problems occur with shelf replenishment in the store and 15 per cent from the regional distribution centre (RDC) to the store. The Corsten and Gruen (2003) findings were further confirmed by research carried out in the United Kingdom by McKinnon *et al* (2007) and Fernie and Grant (2008) and in Denmark by Aastrup and Kotzab (2009).

This situation has been aggravated by the growth of internet ordering for groceries and the use of store-based picking strategies for e-fulfilment to home shoppers. Pioneered by Tesco in the mid-1990s, the other major grocery chains abandoned their dedicated picking centres for store picking in order to achieve greater market penetration at lower cost (Grant *et al*, 2006). The problem with this strategy was that already-congested backrooms were becoming more cluttered as RDCs delivered stock to meet demands of both store and home shoppers. Inevitably the possibility of an OOS situation increased (Fernie and McKinnon 2003).

It was at an ECR UK conference in 2007 that the first reported piece of research on clothing OSA was presented by Carey and Staniforth. Their company, House of Fraser, was experiencing poor availability due to inefficient location of products in crowded stock rooms and the valuable time of staff being consumed by getting product ready for sale. On the back

FIGURE 8.1 Root cause analysis of retail OOS

source: Dybell, 2005

of these results, House of Fraser commissioned a customer exit survey which uncovered that 36 per cent of customers visiting House of Fraser who planned to purchase in fact did not purchase. The main reason for this behaviour was the non-availability of size and/or colour.

It can be argued that the clothing and fashion sector experienced similar in-store replenishment problems to the grocery sector but their problems were aggravated by reprocessing or 'repro' stock which is not accounted for in the re-ordering process. Repro stock is merchandise that is left in other locations in-store such as changing rooms or on other displays. This is more of a problem in this sector due to the usual behaviour of consumers trying on clothing and then discarding those items they do not wish to purchase wherever they see fit. House of Fraser found that all these factors contributed to an overall OSA level of 71 per cent across the stores they investigated, and determined that if half of their customers who could not find stock were able to do so and make a purchase, their sales would increase by £63 million.

It is normally at the store or RDC level that most retail shrinkage occurs in the supply chain, ie consumer, employee and supplier theft, which leads to inaccurate ordering and flawed forecasts. In the United Kingdom the average shrinkage rate is 1.4 per cent of sales (Centre for Retail Research, 2011). Of particular concern to retailers, however, is that 14.4 per cent of shrinkage can be attributed to 'internal errors', such as processing errors, accounting mistakes and pricing discrepancies. For example, poorly trained staff at checkouts can scan items incorrectly thereby causing inaccurate sales data to be transmitted to suppliers.

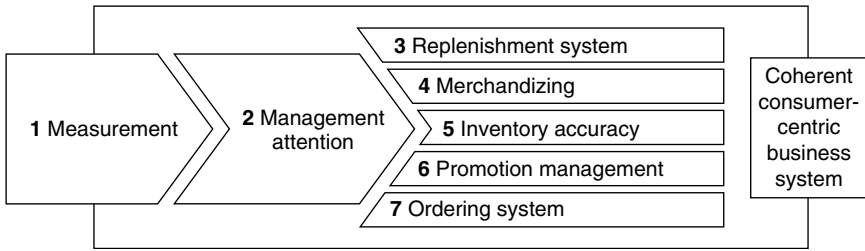
Methods to improve OSA: grocery

Corsten and Gruen (2003) advocated an integrated approach based on process responsiveness, operation accuracy and incentive alignment to address the causes of OOS. The process improvements were related to assortment planning and space allocation; ordering systems, inventory control and store flow replenishment. Operational accuracy remedies were focused upon the accuracy of inventory levels and the ability to measure and identify OSA. Clearly technological advances such as radio frequency identification can improve inventory measurement and accuracy in the future. The final remedy, incentive alignment, is about scheduling staff to improve shelf filling in addition to optimizing overall management objectives rather than sub-objectives by functional area.

In the United Kingdom, ECR UK has been the medium through which the OSA/OOS problem has been addressed by all members of the grocery supply chain; ECR UK is affiliated with IGD. In their initial report in 2004 they commented upon a combination of processes and approaches to tackle OSA. Similar to the Corsten and Gruen study ECR Europe has identified seven 'levers' that can be used to improve OSA; see Figure 8.2. These are measurement 'levers' that need 'managerial attention' (levers 1 and 2); replenishment and in-store execution, namely merchandizing (levers 3 and 4); inventory accuracy (lever 5); promotional management and ordering systems (levers 6 and 7). These levers have subsequently formed the basis of the ECR UK availability agenda. In line with the measurement levers, the ECR UK *Availability Survey* became the established method for measuring OSA of the main grocery retailers. Between 2004 and 2011 the survey tracked on-shelf performance of 200 products in 160 stores and was carried out six times a year involving five retailers – Sainsbury's, Waitrose, Tesco, Morrisons and Asda, across eight different categories. Auditors undertook 'mystery shopping' looking for products in specific locations at different times of day and different days of the week.

In the wake of these surveys, ECR UK sought to investigate OSA issues that have arisen out of their reports and case studies from IGD conferences (IGD, 2005). In 2005 three sub-groups were established – *Availability Insights*, *New Product Introduction* and *Promotions and Convenience* (ECR UK, 2006). The latter group mirrored the larger *Availability Survey* by undertaking a quarterly OSA survey across seven convenience store retailers, 97 products and 11 categories.

The new product/promotions group was established to glean a better understanding of the impact that new product launches and promotions have on availability whereas the insights group focused on the health and beauty category because of its consistent poor performance in the *Availability Survey*. By 2011 the final *Availability Survey* was carried out and the sub-groups had completed their research into the OSA issue. Some of this work will be discussed here, especially as the authors carried out

FIGURE 8.2 ECR Europe 'seven improvement levers'

SOURCE: ECR UK (2004)

work on behalf of ECR UK to investigate the cost trade-offs required to ensure greater OSA.

In the first instance we will summarize the research that was included in the previous edition of the book as it applies the seven improvement levers to a company's attempt to improve a very poor OSA performance. Furthermore we addressed the three overarching problems that had been identified in the literature and trade studies: the effect on OOS/OSA from in-store picking for home delivery, promotions, and store size.

The research was conducted in a series of phases. This is summarized in Table 8.1, which shows how the issue of OSA was perceived to be important at senior management level even before the new supply chain director was appointed. The later phases of the research dealt with the implementation of the Focus on Availability Strategy at both RDC and store level.

Measurement levers (1 and 2) have been acted upon through the audit procedures carried out by an independent company on a monthly basis. In addition, at the store level daily and weekly reports keep departmental managers up to date on availability issues on a more regular basis.

Replenishment and in-store execution (levers 3 and 4) have been the focus of much managerial attention. The first task of the new supply chain director was to ensure that if the product was in the store it had to be on the shelf. The Focus on Availability Strategy was formulated by taking one store and aligning all processes to focus on OSA. Stock was re-organized in the backroom so that everything had a place. This meant introducing a new system in the backroom to ensure the proper rotation of stock on receipt of deliveries from the RDC. Inventory accuracy (lever 5) has improved with local forecasting teams at RDCs and stock control teams within stores re-adjusting forecasts prior to the inventory system being updated. By mid-2006 a more retail-centric culture was created, OOS was reduced by 75 per cent and stock backroom levels were reduced by 53 per cent. In logistics, depot productivity had increased by 20 per cent, logistics network volumes increased by 10 per cent and the automated sites were achieving volumes two and a half times greater than in 2004.

TABLE 8.1 The research process

	Applicable ECR improvement levers	Research questions	Data collection methods
Phase 1 (2003–06)	Lever 1 and 2	To what extent is OSA/OOS an integral part of logistics strategy? What measures have been undertaken to improve OSA? How successful were these measures?	Semi structured interviews with Supply Chain Director (2003) and successor (2006); Telephone interviews with senior manager responsible for OSA; Use of monthly independent audit of OSA across all stores
Phase 2 (June to August 2005)	Lever 1, 3, 5 and 6	To what extent was senior management strategy implemented in the Scottish region? What practical measures were undertaken to improve the flow of product from RDC to store? How successful were these measures?	Semi structured interviews with management team at the Scottish RDC, especially the 'availability champion'; Participant observation of the process of replenishment and communication from RDC to nine stores in the region; Interviews with these store managers on the success or otherwise of implementation; Use of monthly reports to audit OSA performance

TABLE 8.1 *Continued*

	Applicable ECR improvement levers	Research questions	Data collection methods
Phase 3 (November 2005 to February 2006)	Levels 1, 3, 4, 5, 6, and 7	<p>To what extent does in-store picking for internet shopping affect OSA levels?</p> <p>What is the impact of in-store promotions on OSA?</p> <p>What is the relationship between OSA and store size?</p>	<p>Semi-structured interviews were held with managers of stores in the Edinburgh region, 'availability champion' of one store, home shopping manager of another store and a convenience store manager;</p> <p>Monthly audit data to measure performance in relation to size, promotions and internet shopping (March 2005–February 2006), complemented by in-store OSA monitoring</p>

Regarding our research question on the impact of promotions on OSA, promotional management and ordering systems (levels 6 and 7) had been a feature of the company's logistical strategy before the appointment of a new management team. The company focused on the best selling 1,000 lines of which one-fifth were promoted at any one time. They then worked with suppliers to match supply with demand through a 13-week planning cycle. It is perhaps not unexpected that the Edinburgh store survey showed that promoted items had better OSA than non-promoted items, especially as a member of staff in store is allocated the task to ensure that all shelves with promoted lines are full and dressed every morning.

The two other research questions in the study that were analysed during the survey were the impact on OSA of store picking for home delivery and store size. Although the literature (Ferne and Sparks, 2004; Ferne and

McKinnon, 2003) suggests that store picking has aggravated the OSA problem, this was not the case in the Edinburgh store. Here, the store backroom was extended to give a dedicated site for internet orders. Furthermore, personal shoppers provide real time input to stock control by reporting gaps on the shelves, OOS and substitution levels.

The main problems facing the company in Scotland were poor OSA levels at convenience store level. Unlike some other regions these stores are serviced by the same RDC that serves all stores in the region. The primary research reinforces the view that convenience stores are low in the priority list when stock problems occur at the RDC and low staffing levels in these stores mean that many of the successive operational procedures carried out in large stores have been less successful in smaller stores.

Our overall conclusion stemming from investigation of the three research questions is that OSA issues can be overcome by simple techniques that focus on human resources. Extending a store backroom to handle more stock is easy, however we determined that the key difference between good and poor OSA levels at this company revolved around management and staff commitment to solving the problem, ie having dedicated staff to address promotional items and personal shoppers for in-store picking versus having insufficient staff to stock shelves and service customers in the convenience store.

The ECR UK Availability Insights Subgroup investigated variations in OSA across several product categories including dairy, frozen foods and health and beauty (ECR UK, 2006; McKinnon *et al*, 2007). The primary objective for this subgroup was to gain insights into OSA issues in UK grocery retailing and look for solutions to assist retailers and suppliers in maximizing sales and profit potential through increased product availability for customers. Our research was instigated by the Subgroup who wished to investigate whether higher OSA incurs significant extra costs affecting profitability but does not make significant differences to consumer choice or behaviour. We were engaged to conduct this study on behalf of the Subgroup and in conjunction with them developed the following research questions related to this objective:

- 1** Does increased OSA and subsequent reductions in OOS provide increased customer service and more satisfied customers, particularly if consumers desire 100 per cent product availability on a relatively constant basis?
- 2** Additional retailer sales and profits from such increased service might be detrimentally offset by increased costs, ie it would cost more to provide the service than the benefits received. Thus, is it economically feasible to do so and what are the effects on customer loyalty and their propensity to substitute should availability levels not reach the ideal?

This exploratory study was undertaken with a major UK retailer and one of its major drinks suppliers (Trautrimis *et al*, 2009). The research study had

two distinct phases. The first phase comprised the bulk of the case study and deeply investigated the category in the retailer's supply chain including product OSA over an extended period of time and consumer actions to buy, substitute or take no action using data provided by an independent, third-party consultant. The study considered important factors and analysed category performance regarding OSA, profitability, and consumer propensity towards substitution and loyalty. The second phase analysed and combined the findings to consider lessons learned and develop a framework and matrix to provide guidance for retailers and supplier-manufacturers in determining and managing optimum levels of availability.

Only chilled juices were chosen for investigation due to their different storage requirements and shelf-lives compared to ambient juices; they also have different supply chains and influences on availability. Ambient juices have a shelf-life between six and nine months; in contrast, chilled juices have a shelf-life of about 45 days. Lower shelf-life for chilled juices is a major concern regarding handling and demand planning and supply chain operations tend to be more expensive than for ambient juices. Thus, the chilled juice category was considered worthy of study by the ECR UK Subgroup and the authors due to its enormous growth potential and its relatively long and demanding supply chain.

The juices investigated belong to a premium-branded product group sold at the retailer and manufactured by the supplier. A sample of eight stock-keeping units (SKUs) was observed as data were available for the entire period under investigation; these SKUs included not only the mainstream flavour of orange but also exotic flavours such as berry and other fruit mixtures. A description of the eight SKUs is provided in Table 8.2.

Profitability and availability data for the first 27 weeks in 2007 were extracted from the enterprise resources planning (ERP) system of the retailer's larger stores for both the retailer and the supplier since these locations provide a high number of substitutes and have the opportunity to allocate shelf space in a more flexible way than smaller outlets. Profitability was measured differently by the retailer and supplier, thus SKU profitability for both was calculated as an index to make the measures comparable and to ensure confidentiality for each participant. The index score of 100 represents the median for the eight SKU sample. The individual SKU scores were calculated as the difference compared to the median and the profitability indices ranged from 57 to 163. We are unable to report further details of the index calculations for business confidentiality reasons.

OSA was determined using the retailer's in-stock definition where a store has an SKU in-stock if it has product available for sale at close of trade on a particular day. The OSA value represents the percentage of the number of stores that were in-stock of a product on average over a week period. The average OSA for the eight SKUs examined was 96.2 per cent over the 27 weeks.

Overall substitutability and loyalty measures were provided for these SKUs by the 'relevance marketing' consultant *dunnhumby* (see www.dunnhumby.com), which developed them from an Electronic Point of Sale

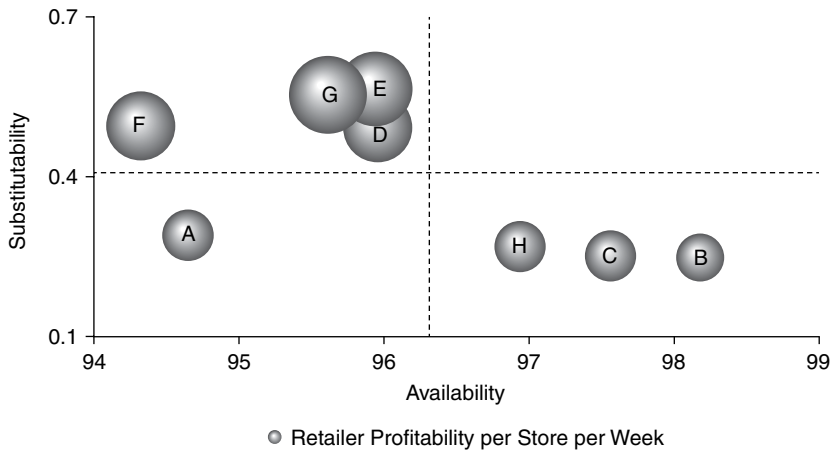
TABLE 8.2 Description of SKUs

SKU	DESCRIPTION
A	Speciality 'Apple and Berry' Juice – 1 Litre
B	Grapefruit Juice – 1 Litre
C	Speciality 'Orange and Exotic Fruit Juice – 1 Litre
D	Orange Juice 'with Pulp' – 1 Litre
E	Orange Juice 'with Pulp' – 1.75 Litre
F	Orange Juice 'without Pulp' – 1 Litre
G	Orange Juice 'with Pulp' – 1.75 Litre
H	Speciality 'Tropical' Juice – 1 Litre

database of over 1.2 million consumers across several UK retailers. Essentially, products that are only purchased separately from one another are seen as substitutes for each other while products that are purchased together are complementary. Substitutability is calculated as an index where the higher the index, the more substitutable products are with each other. In other words the higher the index, the higher the propensity for consumers to substitute this product.

Loyalty is calculated as the proportion of total product spend to total grocery spend by customers who purchased a particular product. The loyalty measure includes the number of purchases and price of the product and also represents brand loyalty as the consumer faces a variety of competing brands and products in a retail store. Also expressed as an index, the higher the value, the more loyal are consumers towards a particular product. Again, for commercial confidentiality reasons dunnhumby would not provide us further details on how these two indices were calculated. Notwithstanding, we consider all these indices appropriate and robust.

Only the relationship between profitability and OSA is discussed here and the reader is referred to Trautrim *et al* (2009) for further detail of the results. Figure 8.3 shows the average profitability indices and availability percentages of the eight juice SKUs for both retailer and supplier over the 27 weeks under consideration. The most profitable SKUs, D, E, F and G, are characterized by below-average availability. This situation may be due to the popularity and relatively higher demand of these SKUs, ie the four orange juice products that generate a high profitability on the one hand but result in more OOS on the other.

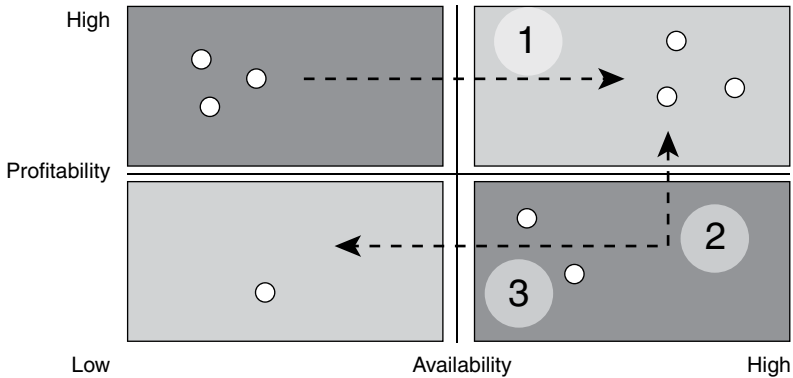
FIGURE 8.3 Substitutability versus profitability and availability

Availability in the chilled juice category may also be affected by promotional activities; many ‘get 3 for the price of 2’ promotions were undertaken during the timeframe investigated that increased demand for these already-popular SKUs. However, promotional products tend to be monitored more closely and other research has found promotional products do not necessarily suffer from poorer OSA levels (Fernie and Grant, 2008).

In contrast, the three least profitable SKUs, B, C and H, had more than average availability. The retailer and supplier noted that obtaining higher availability levels is much easier for slower-moving and less profitable products; replenishment and distribution time is quick when compared to the frequency of sales. But, at the same time distribution costs are relatively high for these products as they do not achieve the same efficiencies as fast-moving products and this is considered to cause the relatively low profitability.

Another finding was the importance of SKU availability to both the supplier’s and retailer’s profitability. That finding should encourage increased collaboration between retailer and supplier due to their profit profiles associated with similar products.

From this research we proposed a three-step framework for retailers to analyse these issues followed by a strategic availability–profitability matrix to investigate OSA performance, identify required changes and prioritize product ranges. The first step to determine optimal availability values is to define values for ‘high’ and ‘low’ availability. Defining an optimum level of availability is likely unique for every category and SKU; chilled juices are relatively difficult to manage as they have a short shelf-life and have to be distributed in a temperature-controlled environment. The average of 96 per cent for the analysed sample may be appropriate considering these factors. At the same time, consumers highly value chilled juices and the category is growing strongly; thus a higher OSA may be appropriate.

FIGURE 8.4 Strategies for profitability versus availability

Based on the above, and our discussions with retailers and suppliers, we consider that a decision for retailers to increase availability is influenced by the following four characteristics – category, SKU, store and consumer behaviour. After evaluating these criteria and factors the second step involves placing every SKU of the category in an availability–profitability matrix as shown in Figure 8.4. We assume every retailer wants to provide high availability for highly profitable products, thus the ideal would be to always have SKUs placed in the upper right quadrant.

If an SKU is within the upper right or lower left quadrant, the relation between profitability and availability is considered satisfactory. However, if an SKU is located in either the upper left or lower right quadrant there is a mismatch and we argue there are three strategic propositions to alleviate them. The arrows and numbers in Figure 8.4 highlight these propositions.

Proposition one is to shift a highly profitable product to a higher level of availability. The major reason for doing so is higher customer satisfaction and an increase in sales due to higher availability. Limitations might include low availability due to generally higher demand than supply. A decision to increase availability should also rely on the related costs to do so. A highly perishable product with a low number of sales would probably not justify such a high availability as wastage would go up.

Propositions two and three apply to products with low profitability but a high level of availability. Proposition two suggests raising the profitability of a product, but that might be a difficult task to achieve given consumer and competitive pressures to keep costs and prices low. Proposition three suggests reducing the level of availability. If a subsequent cost reduction is achieved this latter option will also contribute increased profitability of an SKU.

It is clear from this research that OSA, as a component of customer service, underlies trade-offs between achievable additional sales for higher OSA and the relevant and applicable costs. Both components are strongly influenced by the consumer's reaction to an OOS wherein they face additional transaction,

substitution and opportunity costs. Their reaction relates to product characteristics and the particular situation and will therefore be specific for every purchasing decision. Serving the consumer can be improved by several techniques that mostly concentrate on collaboration between retailers and manufacturer-suppliers. The costs for improving OSA depend on the method used and increase together with higher levels of availability, which makes it extremely costly to obtain 100 per cent OSA.

Methods to improve OSA: clothing

It was reported earlier in the chapter that the first cited piece of research on OSA/OOS was undertaken by Carey and Staniforth in 2007. They showed that in order to improve in-store availability, House of Fraser took their top nine performing stores in terms of turnover and sought the opinions of their employees. The solutions that were trialled were overnight replenishment to make stock available to the customer, pre-retailing at the DC to minimize stock handling by staff in the store and the reduction in catalogue items to focus on the best-sellers. The result was that a 1 per cent increase in staff commitment drove a 9 per cent increase in monthly sales (Carey and Staniforth, 2007).

As the above House of Fraser example was the only published account of OSA/OOS issues in UK clothing retailing at the time, our research was exploratory in nature and focused on the operations of specific aspects of a major retailer's business. In this case the researchers were involved not only in semi-structured interviews with key informants who dealt with the issues but also used participant observation to better understand store operations (Palsson, 2007). Our engagement with the case company stemmed from efforts by the researchers in developing knowledge transfer and impact activities with UK companies. The case company is a major UK department store retailer that operates nationally. For confidentiality reasons we cannot name the retailer and thus cannot provide any other demographic data about them as such information might inadvertently reveal who they are.

As noted above, we conducted two independent research studies with the case company. The context of the first research study relates to the company's objective to increase market share in a specific children's wear category, namely a summertime 'back to school' promotion. This category was chosen because of the short time window for such a promotional campaign in which stores were asked to achieve 100 per cent availability on the top 20 lines in the company's school wear range. Semi-structured interviews were held with company representatives responsible for implementing the campaign within one region and the success of the strategy was monitored through conducting 'mystery shopping' checks on the floor of one store in addition to monitoring all 12 stores in the region to measure availability of the 20 key lines through the company's sales and stock data.

The second research study focused on the product category of women's jeans because it is required to have a constant state of availability; this product category is usually planned into the product catalogues of fashion retailers for up to six months. Thus, there is less emphasis on quick sell-through rates and more emphasis on constant availability in order to maximize sales. Choosing such a product area should once again ensure that availability issues are not over inflated and wrongly reported. It should be noted that Zinn and Liu (2008) selected jeans and trousers in their US study but did not comment on why these product areas had been selected apart from commenting that the apparel company sponsored the research.

The primary research method for the second research project was also mystery shopping. Applying this to a study of OOS/OSA meant monitoring the quality of the processes and procedures used to solve an OOS situation. Therefore, a researcher posed as a consumer looking for a product in a particular size that was unavailable; the advantage to using such a technique lies in the ability of the researcher to measure the process rather than just the outcomes of the service encounter. For example, by engaging in an interaction with shop floor representatives the researcher can uncover the processes and procedures that are available to solve OOS occurrences.

In the first phase of this study mystery shop observations took place in the city of Edinburgh on a Thursday and seven different clothing or department retailers were targeted.

The second follow-up phase used a similar approach; however, instead of entering into discussions with employees of retailers, the researchers visited stores in order to measure OOS/OSA. This involved counting the number of OOS sizes found on a number of products in a sample of stores and calculating OSA. The mystery shop technique was chosen as it is the most realistic in terms of what a customer would find when entering a store. If the store team were aware of a visit to test availability, some attempt may be made to ensure positive results. The case study company granted access to their stores and HQ staff for this phase of the research. A sample of stores for the jeans product area was again visited on a Thursday: the 10 stores monitored included the two largest and most profitable in the chain and the sample was chosen to reflect the company's categorization of store by size and profitability. It was considered that four styles would represent a large enough number to be able to measure and make subsequent judgements of the OOS/OSA position of the jeans product area as a whole. The company's merchandizing team was also involved in supplying electronic data concerning the availability of the jean styles at the chosen stores. This information was requested so that a comparison could be made between inventory data and physical findings in order to determine inventory accuracy.

The results from the mystery shopping research on OSA were very disappointing in both studies. Considering that the back-to-school promotion sought 100 per cent OSA, the data collected from the company's sales and stock records at the end of the promotion period showed that the average sales floor availability across the 12 stores in the region was 73 per cent with

the best store achieving 80 per cent and the poorest achieving 63 per cent. Although two of the smaller stores achieved the poorest availability, there was no clear pattern of stock availability at store or DC level across the region. Indeed, the best performers tended to be the medium-sized stores. The average level of OSA in the second jeans research project was about 79 per cent, however the database availability was about 90 per cent. The 11 per cent difference was partly accounted for through inventory inaccuracy; this finding is similar to that conducted by ECR Europe (2003). Table 8.3 shows the results across all four product styles and is a total per store, representing an OSA average per store across the four jeans styles being measured. For each product style, the total number of missing sizes were recorded and calculated as a percentage based on a total of 19 sizes. The total number of missing sizes was also recorded in relation to the company's database. The difference between actual availability and database availability was then calculated; this should be an indication of database accuracy. The last column represents an average for each variable measured across all 10 stores. At best actual OSA in Table 8.3 was 93 per cent and at worst was 66 per cent; on average stores recorded a 78.9 per cent OSA across all styles. For further details of the results see Fernie and Corcorran (2011).

The research in both studies also explored the attitudes of head office management towards OOS/OSA. All of the seven retailers in phase one of the jeans research project had at least one process available to them to solve an OOS situation when asked by a customer (and in some cases there were several options available). Despite this, the majority of shop floor representatives were unwilling to assist in sourcing the requested OOS product. Of even greater concern was that six out of the seven retailers could, upon further questioning, actually solve the problem. This would indicate that middle market fashion retailers are losing sales through failing to solve such issues. These findings indicated that there was a difference between the attitudes of top management and findings from research conducted in store. For example, results from phase one in the 'jeans' research project did not correlate with the actual processes available to solve OOS issues on further investigation with the case study company. This could indicate a lack of communication between head office and the shop floor. This argument was supported by the fact that these OOS problem-solving processes are not officially communicated to store teams.

Poor communication was also a key theme raised in the 'back to school' research project. Similar issues were identified to those from the Carey and Staniforth (2007) study at House of Fraser. Communications from headquarters about the campaign were not being implemented by store staff. Because of the lack of involvement in the planning process, staff motivation was low and there was a lack of urgency to process stock onto the sales floor and to maintain stock accuracy. The 'repro' stock was also a key area to be addressed, and was also highlighted by Carey and Staniforth; it was also a major factor in explaining OSA in this research project and was mentioned by staff in interviews and was evident in the observational research.

TABLE 8.3 OSA totals across the four product codes

	Store 1	Store 2	Store 3	Store 4	Store 5	Store 6	Store 7	Store 8	Store 9	Store 10	Total Average
Total number of OOS	5	10	26	19	25	16	15	12	14	15	16
Availability %	93%	87%	66%	67%	72%	79%	79%	80%	84%	82%	79%
Total number of database OOS	5	8	11	11	8	7	8	7	6	8	8
Availability %	93%	89%	86%	86%	89%	91%	89%	93%	92%	89%	90%
Total Variance %	0%	3%	20%	19%	17%	12%	10%	13%	8%	8%	11%

Methods to improve OSA: other non-food

The authors have undertaken in-depth case study research in both the grocery and fashion sectors mainly because of excellent access to companies, especially in the grocery sector where IGD acts as an industrial clearing house for practitioner-led research. The authors have undertaken exploratory empirical research in the non-food sector in 2008 and 2012 (Grant and Fernie, 2008; Meng *et al*, 2012). However, data collection has proven to be more difficult with an unwillingness of companies to participate from disparate sectors with only four and six companies participating in 2008 and 2012 respectively.

Our primary research consisted of in-depth qualitative interviews since this topic was under-researched, and investigated how retailers measure OSA and OOS, the main obstacles in achieving high levels of OSA, the improvements retailers believed could be made to improve OSA and reduce OOS, how the retailers carried out forecasting processes to try and ensure high levels of OSA, and what, if any, collaborative initiatives the retailers were involved in to improve operational efficiency. In the 2012 survey two further questions were asked to reflect the importance of e-commerce to OSA/OOS in a multi-channel environment. In the initial study Grant and Fernie's (2008) findings indicated that the four non-food retailers were not as focused on OSA as food retailers. Their poorer OSA levels, ranging from 60–90 per cent, resulted from poor supplier performance, lack of system data accuracy, lack of investment in stock and technology, and weak in-store replenishment processes. There was little collaboration to improve performance and all but one of the retailers was participating in joint initiatives. Further, the adoption of technologies in the non-food sector appeared limited compared to the food sector. Similar results were found in the Meng *et al* (2012) study with poor supplier performance, weak forecasting accuracy, a lack of investment in stock and technology, weak in-store replenishment processes, and little collaboration by these non-food retailers. However, several of them are now involved in web exchanges to try and provide a better offering for customers and thus an enhanced awareness of the internet and its potential is a positive improvement over the earlier Grant and Fernie (2008) study.

Another recent study has considered issues of in-store processes and human resources or factors in interacting with such processes and management systems for replenishment, which are pre-requisites noted below in Figure 8.6. Store operations not only impact product availability, they also represent a large share of costs in the retail supply chain. Labour is the second largest cost factor in retailing and most retail workers are employed at store level (Freathy and Sparks, 1995) and may even account for half of retail operation costs (Broekmeulen *et al*, 2004). Further, Thonemann *et al* (2005) found that staff at the best performing retailers not only spend less time on replenishment activities at the store, but also achieve higher OSA levels.

However, despite the increasing use of technology at store level, most in-store logistics operations are performed manually and eventually still rely

mainly on human labour (Kotzab and Teller, 2005). The way these human resources are managed therefore impacts a retailer's OSA performance. As retail management systems need store-level input, the interaction of employees with them thus influences their outcome. Within the retail workforce a polarization of skills levels has occurred as specialized employees are located at retailers' central operations, whereas shop floor employees faced a deskilling tendency (Freathy and Sparks, 1995). With an increasing proportion of part-time workers and a high labour turnover in the retail workforce, investment in skills is even less considerable for employers and this situation can create a gap in the interaction between sophisticated central management systems and deskilled shop floor workforce, which adds further challenges to the management of in-store processes (Trautrimis *et al*, 2011).

This study (Trautrimis *et al*, 2012a) mapped and explored logistics processes at store level to determine the factors that feed into the design and operation of store replenishment systems and develop typologies of human–management system interaction within these processes. A multiple case study approach was chosen to investigate these research objectives at six retailers in different grocery and non-grocery retail sectors in Austria, Germany and the United Kingdom. Since the complexity of logistics operations increases with size, all of the retailers were market-leading in their respective sector and market and all ran a considerable number of outlets. The coverage of different retail markets also allowed identifying potential environmental factors in the study, eg opening hours and labour regulations.

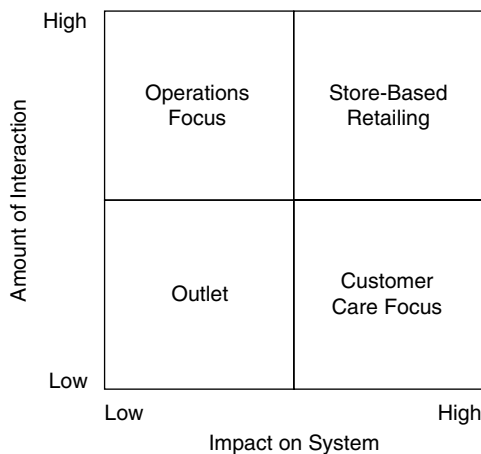
Semi-structured interviews were conducted for data collection with employees involved in in-store logistics processes across hierarchical levels at the participating retailers. Between four and eight employees at each retailer were interviewed, including headquarters, store management and shop floor employees at two stores. Job profiles across retailers varied strongly according to shop sizes and therefore less store employees were interviewed at a convenience store retailer, where the store manager spends much more time on the shop floor and is involved in operational tasks much more than at a hypermarket sized store. Interviews were transcribed and analysed using a reconstructive data analysis method (Trautrimis *et al*, 2012b) and cases were analysed within each case to map in-store logistics processes and across cases to identify influential factors and typologies.

The factors influencing the retailers' replenishment management can be categorized as demand pattern, supply characteristics and other factors. Each factor determined more or less of a need for interaction between humans and management systems in replenishment operations and thus the type of interaction. Some employees interacted a lot with extant management systems, however in many instances they could not make any decisions using the systems, and this type of interaction therefore only works in one direction. The interaction between humans and management systems in replenishment operations stretched over four main tasks of in-store logistics operations: ordering (shop floor and central allocation); data accuracy (checks and quality); physical replenishment of products (replenishment schedules and triggers); and inventory management (backstore and shelf

management). Figure 8.5 presents a typology of interactions between humans and systems at store level. Both axes – how often employees communicate with a system on the y-axis and the extent to which employees can influence system and data on the x-axis – are considered continuums:

- **Operations focus:** the operations focus retailer designs its replenishment system in a centralized and standardized way. Replenishment is managed to achieve efficient processing for a high throughput of products. Employees concentrate on achieving a high throughput of customers through the standardized process, instead of taking much time for every individual customer and its needs. The interaction between humans and management systems appears to be frequent and the process of interaction is designed in a lean way so that every interaction is conducted efficiently and standardized processes exist for every possible action. Unusual and time-consuming issues are passed to the next management level to be addressed. An example for such a retailer is a general goods retailer.
- **Store-based retailing:** the store-based retailer gives much decision making to shop floor employees. Local knowledge and judgement are essential for the operations. Employees need to interact with the management systems more often and can adjust data and orders according to their store's specific needs. Examples for store-based retailing are grocery retailers.
- **Customer care focus:** at a customer care focus retailer, interaction with the customer and not the management systems is at the centre of employee attention. The replenishment management system is designed in a way that the employee does not need to often interact with it, but can for customer orders. In case a customer has a particular request, the employee can use the system to learn whether

FIGURE 8.5 Replenishment interaction types



he can help the customer and place orders on the system. Examples for such customer care focused companies are do-it-yourself (DIY) and fashion shoe retailers.

- **Outlet:** the employees hardly interact with the replenishment management system. They put on the shelf what is delivered to the store and have little or no say in what these products are. Correspondingly, they cannot see which products are coming to the store or order products for customers. An example of such a retailer would be a deep-discount or bargain retailer. Also, the way promotions were run at some of the participating retailers in the study followed such an approach where inventory was pushed into the stores.

In practice, the matrix can be used to categorize the way humans and management systems interact in the ‘last 50 yards’ of retail supply chains and adds to our understanding of in-store replenishment management systems and the investigation of OOS root causes. Retailers design their replenishment management systems according to individual requirements arising from demand factors, supply factors and other factors. The matrix also illustrates the different requirements that retailers have towards the interaction of their store employees with their replenishment management systems. These differences occur not only between retailers, but also within one retail company where product groups might have dissimilar requirements towards interaction between employees and management systems.

Conclusions

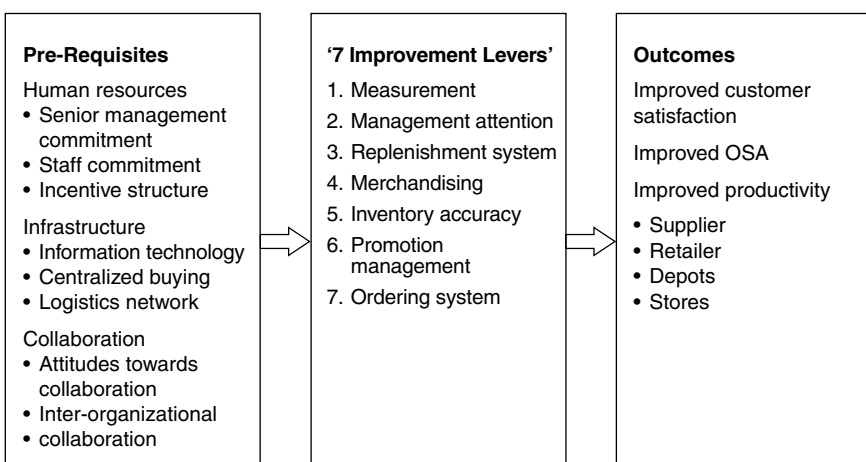
This chapter has shown that OOS/OSA has been a topic of much academic and practitioner interest during the last decade. It is clear, however, that the issue has been tackled in a much more robust manner by companies within the grocery sector than other sectors of retailing as evidenced from the last section on non-food companies’ lack of commitment to address the issue. The grocery sector identified OOS and OSA as a major issue impacting on company profitability in the early 2000s. ECR UK and its affiliation to IGD has been the vehicle through which the issue has been approached through a series of working groups and surveys, notably the availability surveys carried out from 2004–11. It has been shown from this research, including our own contribution to the work, that most problems occurred in the ‘last 50 yards’ and replenishment to the store from DCs. Furthermore, a commitment to constantly monitoring the stock situation and straightforward operational planning measures ensure that product is made available at point of sale. The ultimate goal of 100 per cent availability is an unobtainable goal in that the cost of holding inventory outweighs the incremental customer benefits. This is particularly pertinent with perishable products as was shown in our study of the chilled juices sector.

The ‘back to school’ promotion in trying to achieve 100 per cent availability also confirms the unrealistic goals set out by management especially as staff were not ‘bought into’ the project. This resulted in poor staff motivation and a lack of urgency to process stock onto the sales floor and to maintain stock accuracy. Similar to research in the grocery sector, most OOS problems in this and the jeans study occurred at store level, especially in relation to replenishment procedures. Here, the ‘last 50 yards’ problem was noted with stock in the storeroom or in ‘repro’ but not on the shelf. This further led to errors in stock files because stock would be ordered because of perceived OOS situations. OSA levels were between 73 and 79 per cent in our clothing research yet there is no real guidance on ‘acceptable’ levels to compare with the ECR work on grocery. It is clear from the company’s policies and projected inventory levels that accepted levels should be considerably better than those identified in our research.

The authors have provided a conceptual model for OSA improvement based on the ECR ‘seven levers’ as shown in Figure 8.6. In order to address the ‘seven levers’, certain pre-requisites are required such as management commitment and a motivated workforce; a strong information technology, centralized buying and logistics network infrastructure; and a high degree of intra and inter collaboration within the sector. Then, management can tackle the availability agenda using the ‘seven levers’ blueprint as a guide in the same way as ECR Europe provided 14 improvement areas for implementing ECR initiatives in the 1990s. The outcomes from implementation would be greater consumer satisfaction because products are in stock in addition to improved logistics network reliability and improvements in overall productivity, thereby reducing costs.

The application of the conceptual model to our research outlined in this chapter helps to explain the differences between the grocery market and

FIGURE 8.6 Conceptual model for OSA improvement



other sectors. The implementation of ECR principles is well advanced in the UK grocery sector where the prerequisites are in place compared with the examples shown in the non-food sector. Even in other parts of Europe, many of the prerequisites in Figure 8.6 have not been realized in the grocery sector. For example, Aastrup *et al* (2008) showed that a lack of collaboration between supply chain partners was a barrier to successful ECR implementation. Similarly, Fernie *et al* (2004) highlighted the importance of centralized decision-making systems and advanced IT systems in realizing Collaborative Planning, Forecasting and Replenishment (CPFR) objectives in Europe. This research identified UK grocery companies to be the most advanced in CPFR implementation.

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The development of e-tail logistics

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Introduction

E-commerce, the sale and distribution of goods and services via electronic means, has developed rapidly over the last couple of decades. There are a variety of e-commerce sectors including: business-to-business (B2B); business-to-consumer (B2C); business-to-government (B2G); consumer-to-consumer (C2C) and government-to-business (G2B). This chapter is concerned primarily with, B2C and C2C e-commerce. M-commerce, the use of mobile technology for the selling of goods and services, is developing even more rapidly. Although many retailers use 'm-tail' as a new and popular route to selling goods and services to consumers, its development is in its infancy at the time of writing and many consumers use mobile technology as an additional interface with the e-tail platform and distribution network.

Non-store shopping is not new. Traditional mail order goes back over a century. The 'big book' catalogues of the mid-20th century that were used to sell to family and friends experienced slow decline with the advent of more upmarket and more precisely targeted 'specialogues'. Some large UK retailers like Argos and Next use catalogues to support their store and e-tail formats as well as an additional channel to market. Nevertheless, the tradition of selling to friends and family continues with party plans, most notably Ann Summers, and door-to-door selling through Avon and Betterware catalogues. These 'low tech' forms of selling accounted for around 4–5 per cent of all retail sales in the United Kingdom and the United States for many years until the turn of the century when the 'higher tech' options dominated the marketplace. Initially, the 'hype' exceeded reality and after the dot.com boom in the late 1990s, a considerable shakeout of

the industry took place throughout the next decade as internet shopping began to experience steady growth. This chapter will discuss the growth of e-commerce, the evolving market and consumer responses to online retailing. The logistical challenges faced by the retail sector will then be discussed, especially the difficulties encountered in solving the 'last mile' problem in the grocery sector.

The growth and development of the e-commerce market

While it is generally accepted that e-commerce grew considerably in the 1990s and the early part of this century, accurate, reliable figures were difficult to ascertain because of the need to agree upon a widely accepted definition. Now statistics on internet use, e-commerce and e-tailing are widely available. For example, in the United Kingdom, statistics.gov.uk provides a monthly index of retail sales including non-store retail sales, while leading online trade body IMRG provides global and country e-commerce statistics plus in-depth e-commerce data.

The growth of e-commerce was closely linked to the development of internet usage. In 2000 there were just over 350 million internet users in the world, a figure that grew to over 2 billion in the next 10 years and is forecast to grow to 5 billion by 2015 (IMRG, 2011). Asian internet users form the highest proportion, followed by European and North American users. But internet access itself was not sufficient to deliver large-scale online retailing. Early download speeds were too slow to support creative online visual merchandizing and the interactivity with customers that retailers enjoy today. The growth of broadband allowed faster download speeds and facilitated the growth of successful e-tail websites. This, together with a strong focus on improving security of transactions, encouraged growth in online spend by consumers. The rapid growth of mobile broadband added a further channel for e-commerce bringing with it consumers who had never shopped via 'traditional' e-tail websites.

Early research focused upon B2C transactions, although few companies in this sector made a profit in the early years of e-commerce. In the early years it was the B2B and C2C sectors that produced real benefits to customers and increased profitability for the partners involved. In C2C markets, intermediaries such as eBay acted as online auctioneers brokering deals between bidders and sellers. Similarly B2B exchanges, such as GlobalExchange, promoted online auctions and collaborations between partners to reduce costs. Businesses involved in exploiting these e-commerce markets are called infomediaries in that they are trading information and are facilitators in reducing transaction costs between buyer and seller.

The problem with the B2C model compared with C2C and B2B models was the requirement to trade goods that were tangible and need to be stored and transported to the final consumer. (Later, some of these goods, such as music and books, were converted to electronic formats that were downloadable directly to consumers' computers, mobiles, mp3 players and e-readers.) Additionally, a market presence and brand identity were necessary ingredients to wean customers away from their traditional methods of buying. Yet despite these apparent drawbacks, the 'hype' associated with this new form of trading led many analysts to discuss the notion of disintermediation in B2C markets. This means that the role of intermediaries – agents, wholesalers and even retailers – would be reduced as manufacturers were enabled to interact with and sell directly to consumers. Traditional retail channels were to be disrupted as new players entered the market with online offers. Not surprisingly, many conventional retailers reacted passively to the new threat due to concern that they would cannibalize their existing customer base and jeopardize their investment in capital assets (eg stores). Many early pure player e-tailers, such as European fashion entrant Boo.com, sustained losses and there were numerous bankruptcies; others such as grocery e-tailer Peapod were taken over by major retail groups (Ahold in this case).

With hindsight, a multichannel strategy was the obvious route to success, especially for companies with a mail order presence. Some early multichannel retailers, such as Eddie Bauer and Dixons, indicated that customers shopping at all channel alternatives (stores, catalogues and online sites) spent more than single- or dual-channel customers. This 'clicks and bricks' approach gave a customer greater flexibility including, in the case of clothing products, the opportunity to return goods to their nearest stores. This customer flexibility was to be a focus for e-tail differentiation as the platforms for selling diverged – firstly with the growth of mobile retailing and retailing via social networks; secondly as customers drew strength from their abilities to review products and retailers, and their influence over sales grew through e-word-of-mouth on networking sites like Twitter and Facebook; and thirdly as customers began to demand diverse delivery options for the goods they bought online.

In some countries with well-established e-commerce sectors, the early years of the 21st century produced enormous growth in sales for successful e-tailers. Growth levels began to steady after a decade or so. According to retail commentators, this was not due to an unstable economic environment, but a sign of a maturing B2C e-commerce market. Within this market some multi-channel retailers (retailers operating multiple shopping channels including – but not confined to – physical stores, catalogue and internet shopping) were producing growth levels far in excess of market norms and consolidation was apparent among smaller and weaker pure players. Increasingly, in maturing online markets, large-scale multi-channel retailers were becoming dominant.

FIGURE 9.1 The evolution of e-tailing

Hype & Experimentation	Retrenchment & Sobriety	Sustainability	Focus and Fragmentation
Rapid and erratic change	Slower and more predictable change	Stability emerges with predictable cyclical patterns of differentiation	Continued cycle of differentiation by low prices or specialization
Entrepreneurial pioneers with ambitious expansion plans, high start-up and failure rate	E-pioneers forced to adapt or die, physical retailers enter market through various modes of entry	Consolidation, focus strategy through cost leadership or differentiation	Increased business efficiencies → lower prices, integrated multi-channel systems

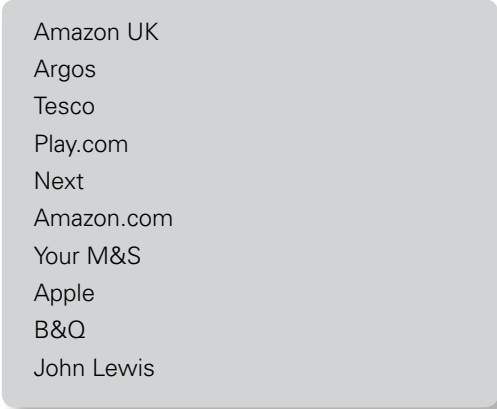
SOURCE: Williams, 2009

According to Williams (2009) there has been a four-stage process in the evolution of e-tailing (Figure 9.1). Stage 1 included the hype and experimentation that led to the dotcom boom and bust at the turn of the millennium. This was followed by a stage of retrenchment and sobriety as funding sources for innovators dried up at the same time as the potential of the e-tail market developed and became more apparent for many established retailers. The third stage, sustainability, featured stability in the market and consolidation among e-tailers. A fourth stage of focus and fragmentation is evident as retailers provide shopping opportunities in multiple and mobile platforms, tailor their marketing mixes more precisely to the needs of individual consumers and develop multiple delivery options.

Maturing e-tailers in economies where the strong rate of growth of the online market is slowing increasingly view international e-tail activity as the way to continued prosperity with the Asia-Pacific and South American markets offering the most potential. The United Kingdom is one of the strongest e-tail markets, with high penetration of broadband and experienced consumers that (in 2011) had the highest per capita online spend in the world. It is also the base of a range of e-tailers with up to 20 years' experience in online activity. As in all countries, there is considerable year on year change in the e-commerce market and its main players. A snapshot of the state of the market in 2011 based on IMRG statistics appears in Table 9.1 (for selected countries in the world, see www.imrg.org). At this time, online spend was estimated at 18 per cent of total retail sales, and forecast to have double digit growth in the ensuing few years. In the United Kingdom there has been considerable change year on year in terms of e-tailer rankings, although pioneer pure player Amazon and mature clicks and bricks retailers Argos and Tesco have featured prominently for a long time. A snapshot of the leading e-tail players in 2012 appears in Table 9.2. In terms of the emerging M-commerce market, one technological commentator regarded Amazon, electronics retailer and manufacturer Apple and infomediaries Google and Facebook as being key competitors.

TABLE 9.1 A snapshot of the UK e-commerce market 2011

Population	61 million (UN)
Internet users	51 million (2011)
Internet shoppers	37 million (2011)
Internet household penetration	73% (2010)
Broadband household penetration	70% (2010)
Mobile subscriptions	80 million (2010)
e-Com spend per capita	£963 (2010)
Online sales	€70 billion/£58.8 billion (2010)
Online sales growth rate	18%
Average e-retail basket value	£136
Average e-retail basket value Multichannel retailers	£189
Average e-retail basket value Online-only/catalogue retailers	£101
Online spend per shopper/annum	£1,870 (2010)
Online vs high street comparison	17%/83%
Top three sectors	Clothing; beer, wine and spirits; health and beauty (2010)
Top male purchases	Films and music
Top female purchases	Clothes and sporting goods
E-retail parcel deliveries/annum	£1.2 billion (2010)

TABLE 9.2 Top 10 UK e-tailers 2011

- Amazon UK
- Argos
- Tesco
- Play.com
- Next
- Amazon.com
- Your M&S
- Apple
- B&Q
- John Lewis

SOURCE: IMRG, 2011

Web 2.0

Web 2.0 is a term encapsulating a number of software developments that allowed the web to be used for information sharing and collaboration, fostering creativity, user-centred design and interoperability. Web 2.0 encouraged collaboration among professionals and academics and underpinned the development of wikis, blogging and social networking sites.

The power of information sharing was understood comparatively early in the history of e-tailing by Amazon. The company exploited this by facilitating customer reviews of books purchased and making the reviews easily available for online shoppers, together with professional reviews and author information. Later, potential customers were given information on book alternatives and on the final buying decisions of other page viewers.

Web 2.0 allowed for the application of pure marketing principles to the e-tail market. There was a move from straightforward brochure-like visual content on e-tail webpages to placing the user/customer at the heart of the service, certainly in terms of service participation and personalization of content. This was further refined and exploited by mobile phone apps that gathered customer-customized data from a range of sources.

Many academics and retail professionals noted that the digital revolution shifted power in the marketplace to consumers. The increase in power comes from more information and transparency of information that enabled group power, allowing consumers to influence products and prices. Not only does this affect how retailers market products but also how they communicate with their customers (Kucuk and Krishnamurthy, 2007).

The level of disintermediation that was expected in a virtual market did not take place to the extent expected early in the development of the e-tail market, partly because large multi-channel retailers exploited the strong

brand presence gained in traditional markets to pursue share of the online market. However, the existence of Web 2.0 enhanced the role infomediaries played in the online market and some, such as Google, eBay and Facebook, became household names.

Exploiting the long tail

When e-commerce was in its infancy, a transformation of marketing was predicted, including the facilitation of one-to-one marketing that is one of the features of e-tail today. The web allowed for the accumulation and refinement of an enormous amount of customer data. This was made possible through the integration of customer-facing retail websites with customer relationship management (CRM) software. The relatively easy accessibility of a wealth of individualized customer data, including browsing and shopping habits, allows e-tailers to effectively and profitably market on an individual basis (Doherty and Chadwick, 2010; Frow and Payne, 2009).

The 'long tail' was a term coined in the early 2000s to describe an emerging feature of the online marketplace in which niche demands can be profitably exploited. In some e-commerce market sectors, supply is not limited by shelf-space and how much it costs to manufacture, store and distribute a product. It becomes virtually abundant at such low cost that it can be provided at low levels of demand, whereas the costs of providing it through traditional channels outweighed potential revenues. Two examples are downloadable books and music.

Amazon developed its retail website, just-in-time delivery and huge capacity for storage to offer an almost limitless range of book titles, so that niche demand could be profitably exploited for physical books. It then successfully launched an early e-reader so that niche demand for reading materials could be exploited even more seamlessly and cheaply. Facilitation of the publishing process was a logical development so that reading materials could be supplied more efficiently for niche consumption. Apple used its innovative design capability to launch a stream of interactive hardware devices that attempted to 'tie in' customers to products such as music and software that could be purchased or downloaded only via Apple stores.

The conventional Pareto Principle (or 80:20 rule) assumes that 80 per cent of sales could be attributed to 20 per cent of products – most sales are linked to best-selling items. The evidence of the 'long tail' indicates that this is not applicable for online distribution and that collectively niche products can rival best-sellers in terms of sales volume. One study investigating the 'long tail' concept found that, for the same multi-channel retailer, the internet channel showed less concentrated sales distribution than the conventional channel. Product availability and pricing were the same in both channels, so the 'long tail' effect was not caused by differences in distribution but by the use of internet search and discovery tools that lowered search costs for customers (Brynjolfsson, Hu and Simester, 2011).

If Web 2.0 has enabled, simplified and reduced consumer costs for making buying decisions and underpins the ‘long tail’ of the online market, it seems clear that there will be similar influences on the marketing of goods and services – a case of the ‘tail wagging the dog’ perhaps. Eric von Hippel (1986) has long noted the importance of user innovators sharing ideas with manufacturers to enable development of the products they want. More recently (2005) he concluded innovation has become more user-centred. Web 2.0, having made the sharing of information easier, faster and commonplace, means businesses that want to compete for the sizeable ‘long tail’ market can implement ‘long tail’ marketing (Andrei and Dumea, 2010). This includes reaching niche customers in innovative and cheap ways that will change over time. Some current examples include:

- exploiting the potential interactions through social networks and online networks;
- communicating via blogs, RSS feeds, webcasts;
- stimulating e-word-of-mouth through buzz and viral marketing; and
- pay-per-click and search engine optimization that focuses on less competitive ‘long-tail’ keywords that offer a higher return on investment than generic keywords.

Clearly, the development of Web 2.0 infers future fluidity in online markets and in the methods and means of reaching and interacting with online customers in the future.

Marketing-orientated retailers, being customer-facing organizations, have been at the forefront of user-centred innovation for many years. Many major retailers have been involved in product manufacturing through the development of their own brands, with some vertically integrating the supply chain to the level where they influence the raw materials from which the products sold in their stores are made. So it is not surprising that maturing e-tailers are in a position to exploit ‘long tail’ marketing, not only in the development of their retail goods and services, but in development and maintenance of their organizational brands, ‘using Internet technologies to enabled an organized cooperation with their users, giving them a voice and relying on their contribution to the process of innovation and brand value creation’ (Andrei and Dumea, 2010).

The interactivity, transparency and fluidity among online social groups and customers that was fostered via Web 2.0 and that contributed to the emergence of the ‘long tail’ have been exploited by large pure players like Amazon, eBay and ASOS.com as well as by multi-channel retailers like Tesco and Apple and internet brands Google and Facebook. For example, Amazon allows customers to choose to buy books from them or from partners with transparent pricing. eBay lets buyers and sellers of niche collectible products agree their own price for trade. ASOS.com encourages customers to post pictures of themselves wearing ASOS merchandise. Tesco allows customers to shop for brands with partner retailers via its website. Apple hosts apps

for the Amazon Kindle so Apple customers can download books from its competitor. Google launched its own social network in 2011 and runs YouTube and Android which offers music, TV and book apps. Facebook launched new music, TV and news apps and is considering co-branded mobile phones.

Online shopping formats

The e-commerce market allowed for a great deal of creativity in the design of e-tail stores. As the B2C market developed, a number of distinct online retail formats could be distinguished (Zentes *et al*, 2011). Firstly, *price formats* such as Overstock.com, ASOS Outlet and Tesco Outlet sell overstocks or products from previous seasons and auction sites such as eBay allow buyers and sellers to mutually agree the selling price. Customers are attracted to e-tail portal sites that offer points or cash back for accessing other e-tailers via their websites. Current examples are Quidco and Topcashback.

Secondly, *experiential formats* apply the potential of technology in creating an interesting and enjoyable online shopping experience, leading the way in exploiting social networking and discussion forums. One example includes fashion e-tailers such as ASOS and Net-a-porter, that have developed editorial content and two-way/multi-way channels of communication between customers and e-tailer and among customers. Another example is that of pop-up, linear 'shops' advertising products that could be downloaded for view, or purchased and delivered via mobile phone, which exploited an increasing desire for mobile shopping and explored the potential for selling via the 'm-channel' as mobile internet access moved towards overtaking desktop internet access in 2013/14.

Thirdly, *community-based formats* began to emerge that placed a virtual social community at the heart of the shopping experience. Amazon's customer reviews and customer purchase trends positively affected sales of popular products and the popularity of Facebook led many e-tailers to establish Facebook formats.

Fourthly, *mass customization formats* emerged that exploited the interactivity of the online environment to provide merchandise precisely tailored to the individual desires of customers. For example, customers can customize fashion items like shoes, selecting from a range of heel heights, fabrics and leathers and decorations on Shoesofprey.com or customize trainers with Vans or Nike online, while Apple customers can choose various features for the hardware they buy and add engravings and accessories to their personalized mix.

Finally *merchandise-orientated formats* focus on achieving a product mix that attracts customers. Types of merchandise-orientated e-tailer including online department stores like Debenhams.com or Johnlewis.com replicate or adapt the 'high street' store online, while niche e-tailers are online specialty stores specializing in a limited product range. Examples include Wiggle.com

the bicycle e-tailer and Net-a-porter specializing in upmarket fashion clothing. Online marketplaces like Tesco Direct and Amazon Marketplace allow customers to access a wide variety of products from partner organizations and/or from other customers. Online category killers achieve depth of range of a limited product category such as toys (Toys R Us) or electronics (Pixmania), aiming to compete on price.

The e-commerce consumer

In only a decade or so, internet connectivity changed from an English-speaking, developed country phenomenon to a global one. This conceals the different stages of development for different country markets and the geodemographic profile of internet consumers. Most European countries lagged behind the United States, which had more than 80 per cent of households connected to the internet as early as 2001. As the market matured, the profile of the consumer began to be more representative of the population it served. In the early stages of development the profile of the e-commerce shopper was a young, male, professional living in a middle class neighbourhood. As the technology became more accepted, the gender and socio-economic mix also changed. CACI, the market research group, did an analysis of online behaviour and buying activity of adults (over 18 years of age) in 2000. Table 9.3 provides the detailed classification of eTypes which shows an online lifecycle from infrequent online purchases – virtual virgins, chatters and gamers and dot.com chatters to frequent online purchases – surfing suits and wired living. CACI has updated this classification into eight groups, embracing life stage and internet usage levels and 28 types, denoting online behaviours. This has been achieved through their own Ocean database, which has 40 million names and addresses classifying individuals by affluence, lifestyle, geographical and life stage attributes.

Initial research in the late 1990s showed how the e-tailing market matured both in terms of the customer base and the range of online offerings. Lavin (2002) drew upon consumer surveys undertaken by consultancy companies during Christmas 1998 and 1999 and her own primary research of retailers' websites during the same period. She comments that the profile of the web shopper had changed, e-tailers had worked to meet rising consumer expectations and the 'first to market' advantage of early adopters had been eroded away. The customer of 1998 was predominantly male, technologically proficient and relatively affluent. More significantly they were not mainstream shoppers and had low expectations for their online purchase experience. She equates this with the innovator and early adopter stages of the adoption lifecycle. A year later, with a rapidly growing market, the profile of the online customer had changed to a more balanced gender and age with overall lower average incomes. These are more likely to be mainstream shoppers with higher expectations from their purchase experiences.

TABLE 9.3 Segmentation of online consumers in the United Kingdom**Group 1 Virtual virgins**

Of those online, this group is least likely to have bought online. Less than two per thousand will have made any form of online purchase last month. Their time online is half the national average and they are likely to have started using the internet more recently than other people.

With the exception of chatting, this group do internet activities less frequently than average. Because of their relative inexperience they are more likely to worry about security and delivery problems with buying on-line and to consider the process to be difficult.

People in this group are two times more likely to be female compared to any other group. The elderly and children are more commonly found in this type than any other.

Group 2 Chatters and gamers

This group, predominantly young males, might spend as much time online as the most avid type of internet user, however they tend not to be buyers. Only one in five will ever have made an online purchase. They may consider shopping online to be difficult and their fear of delivery and security problems is above average.

These people are avid chatters and gamers who use news groups and download as frequently as the most active and experienced surfers. Nearly half are under 25. The schoolchildren in this type are more likely to connect from school/university than any other eType, although connection from home is still the most frequent.

Group 3 dot.com dabblers

As average internet users, these people have mixed feelings regarding the pros and cons of online shopping. Around 40% will have made some form of purchase online and, with the exception of chatting, their interests spread all forms of internet activity.

These people may see benefits of the internet in convenience and speed of delivery. Alternatively a specialist product not available elsewhere may have introduced them to buying online. In any event their enthusiasm for e-commerce is not yet complete.

TABLE 9.3 *Continued***Group 4 Surfing suits**

Although they spend less time on the internet than average these people can be quite enthusiastic on-line purchasers. They are more likely than average to have bought books, software, hardware, holidays, groceries, insurance and tickets for events online.

Shopping online is seen to offer benefits such as range of product information, speed of ordering, price advantages, and an element of fun. They are less likely to fear e-commerce.

They control their time on the internet and surfing, searching, e-mail and news groups tend to be preferred to chat, games, or magazines.

Group 5 Wired living

These are cosmopolitan young people and the most extensive internet users, spending four and a half hours online each week. They are more experienced than most online and on average they have been using the internet for three years. Over 70% will have purchased over the internet, covering between them the full gamut of products available for purchase. Over 60% of these people are educated to degree level.

These people use the web as part of their lifestyle. Preferred interests tend to be newsgroups, news and magazines, with only an average interest in games or chat.

SOURCE: CACI, 2000

Morganosky and Cude (2002) undertook one of the few early studies on the behaviour of online grocery shoppers. Their research was based on a longitudinal study of consumers of Schnucks Markets, a St Louis-based chain of supermarkets operating in Illinois, Missouri and Indiana. The first two surveys in 1998 and 1999 asked Schnucks' online shoppers to complete a questionnaire online on the completion of their order. The final survey re-contacted respondents from the 1999 survey to track their shopping behaviours in 2001. The results here did have some parallels with the work of Lavin (2002) above in that the consumer was more sophisticated and had moved on from being 'new' users to experienced online shoppers. This is further reflected in their willingness to buy most or all of their groceries online and to improve their efficiency at completing the shopping tasks. Online grocery shoppers bought for the family. They were younger, female and better educated with higher incomes. The final survey showed that customer retention rates were good. The main reason for defections was the relocation to

another part of the United States where the same online service was not available.

In the United Kingdom, Ellis-Chadwick *et al* (2002) completed a longitudinal study of internet adoption by UK multiple retailers from 1997 to 2000. Again, as in Levin's study, the primary research was largely based on reviewing retail websites over this four-year period to ascertain how internet business models were being developed. They report a six-fold increase in the number of retailers offering online shopping to their customers. Other researchers in the early 2000s followed this lead of examining websites of UK fashion retailing (Marciniak and Bruce, 2004; Siddiqui *et al*, 2003; Ashworth *et al*, 2006) and speciality stores in the United States (Feinberg *et al*, 2002) with a focus on either the supply side – retailers' use of the website for transactional or informational purposes or the demand side – the evaluation by customers of the ease of navigation, interactivity and product information of these websites. Readers are referred to the *International Journal of Retail and Distribution Management*, vol 33, no 2; vol 34, nos 4/5 and vol 34, no 7, which has special issues on online shopping and e-commerce in the retailing sector.

In the 2006 double issue, the editors Doherty and Ellis-Chadwick critically review research on internet retailing to that time by undertaking a content analysis of papers published in all journals from 1996 to 2005. They classify the research into three themes: the retailer perspective, the consumer perspective and the technological perspective. Most initial research focused upon the retailer perspective undoubtedly because of the managerial challenges involved. Hence, some of the research cited above in the late 1990s/early 2000s focused upon retailers' adoption of the internet as a channel to market. As the web became an accepted technology, research then moved more to the online behaviour of consumers from consumers' characteristics to their online experiences and the incorporation of established consumer behaviour models to an online environment. Finally, the technological perspective has demanded less attention although there have been meaningful contributions on website design, software tools and e-commerce infrastructure.

It has been shown that much research has taken place into profiling the internet shopper. In terms of demographic variables, key influences on online behaviour include income, education, race, age and gender, with lifestyle, culture and social factors also of importance. However, research has found that as the online market has matured, the general demographic profile of online shoppers has become more similar to those of traditional shoppers. Psychographic/behavioural variables include the perceptions, attitude and beliefs that can influence online shopping intentions and behaviour. Internet shoppers, according to a major international study, tend to be more impulsive, value convenience, tend to be wealthier and are heavier users of internet and e-mail. They also have favourable attitudes to advertising and direct marketing (Doherty and Ellis-Chadwick, 2010).

The profile of an online shopper is not just linked to demographic and psychographic/behaviour variables that favour online shopping, or to geography, technology and confidence in the online market, but to the merchandise being bought. For example, the age profile for online grocery shoppers tends to be younger, in the 18–40 year old range. There tend to be children in the household. A study by IGD, formerly the Institute of Grocery Distribution, found that online shopping for groceries was linked to the birth of children, and to times such as school holidays, when children are around the house more. Grocery shoppers also tended to be in the higher social categories. Older shoppers (65 plus) were less likely to shop online for groceries (IGD, 2011).

These studies, including the sector specific/trade organization investigations, such as that by IGD above, indicate that retailers are responding to this changing market environment. The basics of convenience, product range, customer service and price will always feature in a consumer's 'evoked set' of attributes. Above all, retailers have become brands and customer loyalty has been established through continually high levels of service. It is not surprising therefore that it is traditional retailers with strong brand equity that can gain even more leverage through a sound web strategy. They have the trust of the consumer to begin with and the capital to invest in the necessary infrastructure. Many dot.com pure players needed to build a brand and tackle the formidable challenge of delivering to customers' homes. This is why it took so long for Amazon.com to register a profit.

It is interesting to note that early research into M-commerce customers indicates some similarities to customers in the early years of the uptake of e-commerce, for example, most shoppers (62 per cent in 2005) were young (14–24) males. They tended to be confident internet users and experienced internet shoppers (Bigne *et al*, 2005). The demographic and gender profile is likely to rebalance as the technology becomes widely familiar and the market develops. Internet use was not found to influence mobile shopping, but previous experience of internet purchase meant consumers were more predisposed to buy on mobile devices.

All of this research shows that e-tailing has been most successful to date where a multi-channel 'click and bricks' approach is adopted. The companies best equipped to adopt such a strategy were traditional department stores and clothing specialists in that they had considerable experience of dealing with the non-store shopper through their catalogues and 'low tech' selling techniques, especially as these companies were well equipped to deal with home deliveries and a returns policy. Similarly the early e-tailing specialist pioneers with CDs, books, videos and computing equipment already had an infrastructure to deal with home-based orders. The grocery sector is much more complex and home delivery is more associated with food service and added-value products. Nevertheless, the sector has attracted considerable attention in the literature and we turn to a more detailed assessment of the market and the online issues pertaining to grocery in the next section.

The grocery market

Despite the fact that online grocery sales account for a small proportion of retail sales in most country markets, this sector has attracted most attention from researchers and government bodies, including the Department of Trade and Industry (DTI) in the United Kingdom at the beginning of the millennium (DTI, 2001). Grocery shopping impacts upon all consumers. We all have to eat! However, our populations are getting older so shopping is more of a chore; conversely, the younger, time-poor, affluent consumers may hate to waste time buying groceries. The relatively slow uptake of online grocery shopping in the United States can be attributed to the lack of online shopping availability in that most online initiatives were promulgated by 'pure players' because of the relative fragmentation of the US grocery market. By the late 2000s/early 2010s there remains several US states, mainly rural ones, which do not have local e-grocery services.

This fragmented market initially encouraged entrants into the supermarket store-based market. In the late 1980s this came in the form of Warehouse Clubs and Wal-Mart Supercenters; by the 1990s dot.com players began to challenge the traditional supermarket operators. Unfortunately these pure players have either gone into liquidation, scaled down their operations or they have been taken over by conventional grocery businesses.

Why have many pure players failed? Laseter *et al* (2000) identify four key challenges:

- limited online potential;
- high cost of delivery;
- selection-variety trade-offs; and
- existing entrenched competition.

Ring and Tigert (2001) came to similar conclusions when comparing the internet offering with the conventional 'bricks and mortar' experience. They looked at what consumers would trade away from a store in terms of the place, product, service and value for money by shopping online. They also detailed the 'killer costs' of the pure play internet grocers, notably the picking and delivery costs. The gist of the argument presented by these critics is that the basic internet model is flawed.

Even if the potential is there, the consumer has to be lured away from existing behaviour with regard to store shopping. Convenience is invariably ranked as the key choice variable in both store patronage and internet usage surveys. For store shoppers, convenience is about location and the interaction with staff and the store experience. Internet users tend to be trading off the time it takes to stop. However, as Wilson-Jeanselme (2001) has shown, the 58 per cent net gain in convenience benefit is often eroded away by 'leakages' in the process of ordering to ultimate delivery. Furthermore, the next two key store choice variables in the United States tend to be price and assortment. With the exception of Webvan, pure players offered a limited

number of stock-keeping units compared with conventional supermarkets. Price may have been competitive with stores but delivery charges push prices up to the customer. In the highly competitive US grocery market, customers will switch stores for only a 3–4 per cent differential in prices across leading competitors. Ring and Tigert (2001) therefore pose the question, ‘What percentage of households will pay substantially more for an inferior assortment (and perhaps quality) of groceries just for the convenience of having them delivered to their home?’ (p 270)

Tanskanen *et al* (2002) argue that these e-grocery companies failed because an electronic copy of a supermarket does not work. They claim that e-grocery should be a complementary channel rather than a substitute and that companies should be investing in service innovations to give value to the customer. Building upon their research in Finland, they maintain that the ‘clicks and bricks’ model will lead to success for e-grocery. Most of the difficulties for pure players relate to building a business with its associated infrastructure. Conventional retailers have built trust with their suppliers and customers. The customer needs a credible alternative to self-service and the Finnish researchers suggest that this has to be achieved at a local level where routine purchases can be shifted effectively to e-grocery. To facilitate product selection, web-based information technology can tailor the retail offer to the customer’s needs. The virtual store can be more creative than the restrictions placed on the physical stocking of goods on shelves; however, manufacturers will need to provide ‘pre-packaged’ electronic product information for ordering on the web.

Online grocery retailing still accounts for a very small percentage of sales in most markets around the world; indeed, most online grocery development has occurred in the United Kingdom, United States and parts of Asia. Tesco has dominated the market through its operations in the United Kingdom and its European and Asian subsidiaries in addition to its share in Safeway’s Groceryworks.com operation in the United States. Peapod, owned by Ahold, indicates that European companies dominate this market. However, the two US giants of retailing – Amazon and Wal-Mart – have initiated trials to have a stronger grocery online presence and this may have implications on the global market.

Tesco dominated the UK grocery marketing the 2000s with estimates of around 45–50 per cent share of the UK grocery online market (Hackney *et al*, 2006; Wilson-Jeanselme and Reynolds, 2006). In 2013 it is around 48 per cent (see Box 1.3 on pages 22 and 23). Tesco’s success has been achieved through its innovative marketing strategy in the early to mid-1990s to challenge and eventually surpass Sainsbury’s as the number one grocery retailer in the United Kingdom. The launch of Clubcard and the online business allowed Tesco to glean a better understanding of its offline and online customers than the competition. While others dithered on whether to follow Tesco’s lead on both loyalty card and grocery home delivery, Sainsbury, Asda and Safeway (now Morrisons) fell further behind in the overall grocery market. Tesco’s use of the store-based fulfilment model (see later section) allowed it

greater UK market penetration before slowly adopting a picking centre approach in areas where demand intensity was high.

One of Tesco's main challengers in the online grocery market, Ocado, had questioned the profitability of Tesco's operation hinting that costs from the online business are being displaced into other parts of the company's balance sheet (*Sunday Times*, 25 November 2007). Ocado adopted the centralized picking model, similar to Webvan in the United States, and has experienced rapid growth since its inception in 2000, becoming a listed company on the stock exchange in July 2010. Ocado claims that their approach is 'greener' through less use of energy than the competition and that the picking centre approach improves product availability thereby reducing waste.

Initially Ocado sold upmarket Waitrose products online from its Hatfield distribution centre (DC) and a series of 'spokes' (trans-shipment points) to a south-east England customer base. Now it has opened a second DC further north at Dorden in Warwickshire and reaches 70 per cent of the UK population with a wider range of products. In 2013 Morrisons signed a 25-year contract with Ocado to enable it to use this DC and Ocado's technology to enter the online market. Morrisons' poor results relative to its rivals in early 2013 were partly attributed to its lack of online presence and its limited convenience store offering. This initiative has led to friction between Ocado and its original trading partner, Waitrose, which gave it a sizeable cash injection to launch the business in the first place. The contract between the two parties expires in 2020 with a break clause in 2017 – something that may be invoked in view of the current situation.

The logistical challenges

Forecasts of the growth of online retail services are invariably demand-driven and assume that it will be possible to deliver orders to the home at a cost and service standard home shoppers will find acceptable. This is a bold assumption. Over the past decade many e-tail businesses have failed primarily because of an inability to provide cost-effective order fulfilment. Initial market research studies identified delivery problems as a major constraint on the growth of home shopping (Metapack, 1999; Verdict Research, 2000, 2004). In the latter report, the level of consumer satisfaction with this delivery experience had been rising. However, 15 per cent of consumers gave 'inconvenience/having to wait in' as a reason for not having goods delivered to the home. More recent research on online grocery shopping behaviour indicates that issues pertaining to substitutions and delivery failures persist (Hand *et al.*, 2009). Comments in the trade press by management in the parcel carrier sector have also alluded to the demand by internet shoppers for more flexible services. This links to innovation in the ordering process discussed earlier leading to the 'any time, any place' mentality and retailers have responded through offering a plethora of delivery (and returns) options

for customers. This means that retailers offer tighter time windows for delivery, provide click and collect choices (the customer incurs the transport costs!) and a range of collection/return points (mainly convenience stores). Some pure players such as ASOS offer free delivery as the cost is viewed as a marketing rather than a logistics cost.

Arguably, the greatest logistical challenges are faced by companies providing a grocery delivery service to the home. They must typically pick an order comprising 60–80 items across three temperature regimes from a total range of 10–25,000 products within 12–24 hours for delivery to customers within 1–2 hour time-slots. For example, Tesco is currently picking and delivering an average of 250,000 such orders every week. On a peak day its Enfield dot.com store will pick 145,000 products. New logistical techniques have had to be devised to support e-grocery retailing on this scale. Online shopping for non-food items has demanded less logistical innovation. Catalogue mail order companies have, after all, had long experience of delivering a broad range of merchandise to the home, while some major high street retailers have traditionally made home delivery a key element in their service offering. Online shopping is, nevertheless, imposing new logistical requirements. First, it is substantially increasing the volume of goods that must be handled, creating the need for new DCs and larger vehicle fleets. Second, many online retailers are serving customers from different socio-economic backgrounds from the traditional mail order shopper. As they live in different neighbourhoods, the geographical pattern of home delivery is changing. Third, online shoppers typically have high logistical expectations, demanding rapid and reliable delivery at convenient times (Xing and Grant, 2006).

Definition of the home delivery channel

The home delivery channel terminates at the home or a nearby customer collection point. It is less clear where it begins. For the purposes of this review, the start of the home delivery channel will be defined as the ‘order penetration point’ (Oldhager, 2003). This is the point at which the customer order, in this case transmitted from the home, activates the order fulfilment process. This physical process usually begins with the picking of goods within a stock-holding point. Only when picked are the goods designated for a particular home shopper. Distribution downstream from this point is sometimes labelled J4U, ‘just for you’.

With the move to mass customization, an increasing proportion of customer orders are penetrating the supply chain at the point of production. Consumers, for example, can configure a personal computer to their requirements online and relay the order over the web straight to the assembly plant. Where this occurs the home delivery channel effectively starts at the factory.

Within multi-channel retail systems, this order penetration point is the point at which home deliveries diverge from the conventional retail supply chain which routes products to shops. For example, in the case of those supermarket chains that have diversified into home shopping, the order penetration point is either the shop or a local fulfilment (or 'pick') centre, where online orders are assembled. Both of these outlets draw supplies from a common source, the regional DC. It makes sense, therefore, to regard the home delivery channel for grocery products as starting at the shop or the pick centre.

While the upper levels of the home delivery channels for grocery and non-food products are markedly different, the last link in the chain (the so-called 'last mile') presents similar logistical problems for different types of online retailer. We will examine first the 'upstream' fulfilment process and then focus on the 'last mile problem'.

Distribution of online purchases of non-food items

The distribution of these items normally exhibits the following characteristics:

- 1 They are generally supplied directly to the home from the point of production or a central DC. Each order comprises a small number of items (often just one) and the order picking is centralized at a national or regional level. A large proportion of the orders are channelled through the 'hub-and-spoke' networks of large parcel carriers or mail order companies.
- 2 Within these J4U delivery networks, each order must be individually packaged at the central distribution point. This not only increases the volume of packaging in the supply chain: it also takes up more space on vehicles in both the forward and reverse channels.
- 3 Within home shopping systems, whether catalogue- or internet-based, there is a large flow of returned product. Typically, around 30 per cent of non-food products delivered to the home are returned to e-tailers (in contrast to 6–10 per cent for 'bricks and mortar' retailers) (Nairn, 2003). This requires a major reverse logistics operation comprising the retrieval, checking, repackaging and redistribution of returned merchandise.

Wide fluctuations in online demand for particular products, particularly newly released items, can cause the flow of freight through home delivery channels to surge. This was illustrated by the distribution of Harry Potter books through the Amazon.com networks to arrive on the doorsteps of tens of thousands of households on the day of publication.

Distribution of online grocery sales

In contrast to the average general merchandise order, which comprises 1–3 separate items, the average online grocery order contains 60–100 items, many of which are perishable and need rapid picking and delivery. This requires localized order picking either in an existing shop or a dedicated fulfilment/pick centre. Over the past few years there has been much discussion of the relative merits of store-based or fulfilment centre picking.

The main advantage of store-based fulfilment is that it minimizes the amount of speculative investment in new logistical facilities for which future demand is uncertain. Webvan, for example, was planning to build a network of 26 new automated warehouses, at a cost of approximately \$35 million each, to provide e-grocery delivery across the United States. Fewer than half of these warehouses were set up before the company went bankrupt in 2001. As a ‘pure-player’ in the e-grocery market, Webvan did not have an established chain of retail outlets and would have had to form an alliance with an existing retailer to adopt the store-based model. Several British supermarket chains, such as Sainsbury’s, ASDA and Somerfield, as ‘bricks and clicks’ retailers, had the option of pursuing store-based or pick-centre fulfilment and opted initially for the latter. Tesco, by contrast, opted for the store-based model. Their experience is described below.

Basing home delivery operations at existing shops allows retailers to improve the utilization of their existing assets and resources. Retail property can be used more intensively and staff shared between the store and online operations. It is possible to pool retail inventory between conventional and online markets, improving the ratio of inventory to sales. This also gives online shoppers access to the full range of products available in a supermarket to which most of them will be accustomed.

Another major benefit of shop-based fulfilment is that it enables the retailer to achieve a rapid rate of geographical expansion, securing market share and winning customer loyalty much more quickly than competitors committed to the fulfilment centre model.

On the negative side, however, integrating conventional and online retailing operations in existing shops can impair the standard of service for both groups of customer. The online shopper is disadvantaged by not having access to a dedicated inventory. Although a particular product may be available on the shelf when the online order is placed, it is possible that by the time the picking operation gets underway ‘conventional’ shoppers may have purchased all the available stock. Where these in-store customers encounter a ‘stock-out’ they can decide themselves what alternative products to buy, if any. Online shoppers, on the other hand, rely on the retailer to make suitable substitutions. Substitution rates are reckoned to be significantly higher for store-based fulfilment systems than e-grocers operating separate pick centres. For example, Ocado, the only UK e-grocery to rely solely on a pick-centre, claims that it can achieve substitution rates of less than 5 per cent, whereas customers using its store-based competitors sometimes experience substitution

rates more than twice this level (McClellan, 2003). In comparing substitution rates, however, allowance must be made for differences in product range. In the early 2000s, Ocado's range of around 12,500 products was less than half that of the major supermarket chains engaged in online shopping (it is now around 20,000 products).

Doubts have been expressed about the long-term sustainability of store-based fulfilment. As the volume of online sales expands, conflicts between conventional and online retailing are likely to intensify. At the 'front end' of the shop, aisles may become increasingly crowded with staff picking orders for online customers. In practice, however, much of the picking of high-selling lines is done in the back store-room. It is at the 'back-end' that space pressures may become most acute. Over the past 20 years the trend has been for retailers to reduce the amount of back storage space in shops as in-store inventory levels have dropped and quick-response replenishment become the norm. This now limits the capacity of existing retail outlets to support the online order fulfilment operation. New shops can, nevertheless, be purpose-built to integrate conventional retailing and online fulfilment. The Dutch retailer Ahold has coined the term 'wareroom' to describe a dedicated pick facility co-located with a conventional supermarket (Mees, 2000).

Most of the purpose-built fulfilment centres so far constructed are on separate sites. They offer a number of logistical advantages over store-based picking. As their inventory is dedicated to the online service, home shoppers can check product availability at the time of ordering and, if necessary, alter their shopping list. The order picking function should also be faster and more efficient in fulfilment centres as they are specially designed for the multiple-picking of online orders.

To be cost-effective, dedicated pick centres must handle a large throughput. The threshold level of throughput required for viability also depends on the breadth of the product range. It is very costly to offer an extensive range in the early stages of an e-tailing operation when sales volumes are low. Offering a limited range can cut the cost of the operation but make it more difficult to lure consumers from conventional retailing. Another inventory-related problem that retailers using pick centres have encountered is the difficulty of disposing of excess stocks of short shelf-life products. When over-stocking occurs in a shop, consumer demand can be stimulated at short notice using price reductions or in-store merchandizing techniques. It is more difficult using electronic media to clear excess inventory of fresh produce from fulfilment centres that consumers never visit.

Several studies have argued that store-based fulfilment is more appropriate in the early stages of a retailer's entry into the e-grocery market (eg Fraunhofer Institute, 2002). It represents a low risk strategy and allows new business to be won at a relatively low marginal cost. As the volume of online sales grows, however, the cost and service benefits of picking orders in a dedicated centre steadily increase until this becomes the more competitive option. Several break-even analyses have been conducted to estimate the threshold online sales volume at which the fulfilment centre model is likely

to be superior. Tesco appears to have reached this threshold volume in the south-east of England. In 2006 it opened its first dedicated fulfilment centre in south London, known as a 'Tesco dotcom only store', because it has a similar format to a conventional shop but is used solely for the picking of online orders. Tesco will have opened seven of these stores in the south-east of England by 2014 (see Box 1.3 on pages 22 and 23). The viability threshold for such dedicated operations will vary from retailer to retailer depending on the size and layout of shops, the nature of the upstream distribution system, the product range and the customer base. It will also be highly sensitive to the allocation of retail overheads between the conventional and online shopping operations.

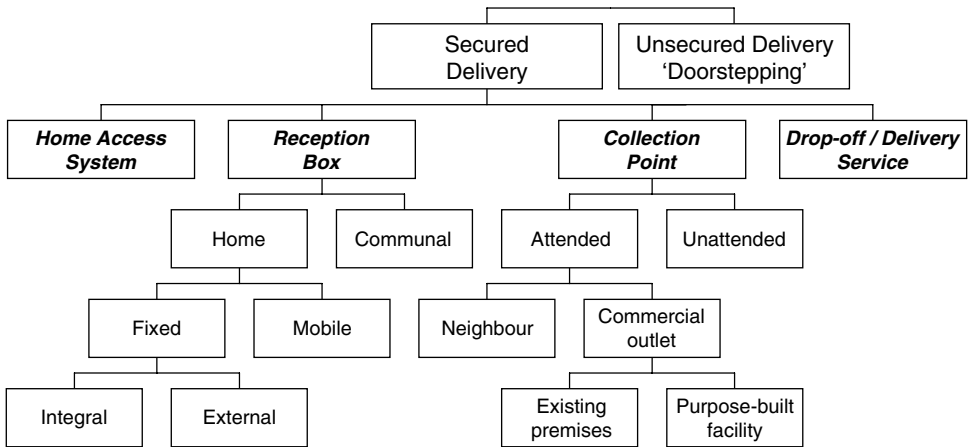
A further complicating factor is the geography of the retail market. The relative efficiency of the two types of fulfilment is likely to vary with the density of demand and level of competition in different parts of the country. In a mature e-grocery market, dedicated pick centres may serve the conurbations, while store-based distribution remains the most cost-effective means of supplying the rural hinterlands. The US e-grocer Peapod has a policy of using store-based fulfilment when penetrating new local markets, working in collaboration with retail chains. Once volumes have reached an adequate level, as in Chicago and San Francisco, the company has invested in 'DCs'.

Experience in the United Kingdom suggests that most new entrants to the e-grocery market opted for the fulfilment model prematurely. Sainsbury's, Somerfield and Asda all set up pick centres and closed them down within a few years. It is now generally acknowledged that at the present level of e-grocery sales in the United Kingdom, the store-based distribution model, pioneered by Tesco, is the most cost-effective.

The last mile problem

In making the final delivery to the home, companies must strike an acceptable and profitable balance between customer convenience, distribution cost and security. Most customers would like deliveries to be made urgently at a precise time with 100 per cent reliability. This would minimize waiting time and the inconvenience of having to stay at home to receive the order. Few customers would be willing to pay the high cost of time-definite delivery, however.

The relationship between the width of home delivery 'windows' and transport costs has been modelled for the London area by Nockold (2001). Expanding the window from 180 minutes to 225 minutes and 360 minutes was found to cut transport costs by, respectively, 6–12 per cent and 17–24 per cent. Eliminating the time constraint completely yielded cost savings of up to a third. Similar research undertaken in Helsinki has indicated that transport cost savings of 40–60 per cent are possible where carriers can deliver at any time during the 24-hour day (Punakivi and Tanskanen, 2002).

FIGURE 9.2 Classification of unattended delivery systems

Such flexibility can usually only be achieved where a system of ‘unattended delivery’ is available. It is estimated that around 50–60 per cent of UK households have no one at home during the working day. An average of 12 per cent of home deliveries in the United Kingdom then fail because there is no one there to receive the goods, imposing a direct cost on carriers of approximately £682 million in 2006 and causing considerable inconvenience to online shoppers (IMRG, 2006). A good deal of creative thinking has applied to this problem.

Figure 9.2 provides a classification of the main forms of unattended delivery that have so far been developed (McKinnon and Tallam, 2003). A fundamental distinction exists between unsecured and secured delivery. Unsecured delivery, sometimes called ‘doorstepping’ in the United Kingdom, involves simply leaving the consignment outside the house, preferably in a concealed location. This eliminates the need for a return journey and can be convenient for customers, but obviously exposes the order to the risk of theft or damage.

When no one is at home, the delivery can be secured in four ways:

- 1 Giving the delivery driver internal access to the home or an outbuilding.
- 2 Placing the order at a home-based reception (or ‘drop’) box.
- 3 Leaving it at a local collection point.
- 4 Delivering the order to a local agency which stores it and delivers it when the customer is at home.

1. Home access systems

A prototype home access system was trialled in the English Midlands. This system employed a telephone-linked electronic key pad to control the

opening and shutting of the garage door. The key pads communicated with a central server allowing the 'home access' agency to alter the pin codes after each delivery. When the driver closed the door, the key pad device issued another code number confirming that the delivery was made. At the same time a confirmation message was sent to the customer's mobile phone or e-mail address. It was found that this system could cut average drop times from 10 minutes to four minutes and, if coupled with a five-hour time window, achieved a productivity level (measured in drops per vehicle per week) 84 per cent higher than the typical attended delivery operation (Rowlands, 2001). Despite these operational advantages, this system failed commercially. Since then two other home access systems have been launched in the United Kingdom, one involving the pin-number-activated release of a physical door key from a secure box, the other integrated into the lock. They can give delivery staff access either to the home or an outbuilding building (Rowlands, 2007). So far there has been limited uptake of these systems and concern remains about the risks posed for home security.

2. Home reception boxes

Several types of reception box have so far been developed:

Fixed, integral boxes

These can either be built into the house at the time of its construction or 'retrofitted'. One system, installed in a few upmarket houses in the United Kingdom, comprises three chambers for ambient, chilled and frozen product and provides access directly into the kitchen.

Fixed, external box

In the short/medium term, there is likely to be more rapid uptake of external boxes, which are much cheaper to install and do not require structural modification to the property. Early models had a key pad which communicated with a service centre and could be activated by a single-use pin code issued to a delivery driver. In an effort to cut costs, most boxes now sold to consumers in the United Kingdom lack this communication interface and are not integrated into the suppliers' or carriers' IT systems (Rowlands, 2006).

Mobile reception box

Mobile reception boxes are filled by the supplier at their premises, delivered to the customer's home and secured temporarily to an outside wall. The main system of this type, which operated for several years in the United Kingdom, connected the box to an electronic device resembling an intercom by means of a steel cable. The supplier or carrier retrieved the box once it had been emptied and used it to recover any returned items. After a trial with a major UK supermarket chain, this system did not prove commercially viable in the UK B2C market.

Communal box

Communal boxes are more suited to apartment blocks and generally comprise banks of lockers.

3. Collection and delivery points (CDPs)

These are locations where customers can pick up goods that they bought online or return online purchases. Weltevreden (2008) distinguishes between two types of CDP: 'locker points' where collection is unattended and 'service points' where staff are in attendance to retrieve the order. The most successful of the locker point systems in Europe employs luggage locker technology that has been extensively used in railway stations and airports around the world. These locker banks have been adapted to the role of order collection by establishing a communication link with a service centre which issues pin codes to delivery drivers and customers. They are used primarily in a B2B capacity at present for the distribution of spare parts to service engineers, catalogues to sales representatives etc. Efforts are now being made to attract B2C business. Several unattended CDP systems involving more sophisticated automated storage and retrieval technology have either failed or not yet progressed beyond the prototype stage. To secure business from e-tailers and carriers, networks of locker banks need to be established to offer wide geographical coverage. Substantial capital investment is therefore required to give a high proportion of online shoppers local access to this type of CDP.

Service points, on the other hand, are generally based in existing outlets, such as small convenience stores, petrol stations, railway stations or self-storage premises. In the United Kingdom, the Royal Mail offers a 'Local Collect' service, which gives consumers the opportunity of diverting an order to a local post office for collection. This service only applies, however, to consignments delivered through the Royal Mail's own carrier networks. Other operators of attended CDPs, the largest of which in Europe is Kiala with roughly 4,500 outlets in several countries, have open networks which any carrier or e-tailer can use (Rowlands, 2006). Weltevreden (2008) estimates that, in 2006, there were around 2,700 serviced CDPs in the Netherlands. Nineteen per cent of online shoppers had used one, though these CDPs accounted for only 1.4 per cent of total online retail sales. Having to travel to a CDP significantly reduces the convenience of home shopping and may only be acceptable to a small proportion of online shoppers. One market survey has suggested that for around 55 per cent of home shoppers in the United Kingdom the most popular form of unattended delivery is leaving goods with next-door neighbours (Verdict Research, 2004). CDPs can, however, serve a useful role as an alternative delivery location when it is not possible to make a home delivery. Repeating the delivery to the home is generally more expensive, increases the consumer waiting time and may again result in a delivery failure. Moreover, when the consumer exhausts

their delivery opportunities, they may have to travel significant distances to the carrier's depot to collect the consignment. A case study in Winchester found that the use of CDPs in the event of a failed home delivery could reduce 'customer mileage' by over 80 per cent (McLeod *et al*, 2006). Dropping an item off at a local CDP for consumer collection can therefore yield substantial cost and service benefits.

4. Local drop-off and delivery

This represents an extension to the collection point service, where the company not only receives the order on the customer's behalf but also delivers it to their home at a convenient time. When the goods arrive, the customer is notified by e-mail, phone or mobile text message and asked to specify a narrow time window within which the goods can be delivered.

To date, there has been very limited investment in home reception facilities. Many of the companies marketing innovative solutions to the last mile problem have gone out of business, while others have redirected their attention to the faster growing and more lucrative B2B market for the unattended delivery of shop orders, spare parts and catalogues. Investment in a fixed box at an individual home can only be justified at present where the customer makes regular use of an e-grocery service. The volume of non-food product being delivered to the home is still much too low to make such an investment worthwhile for the average household. It was estimated in 2003 that only around 22 packages were delivered annually to the average household in the United Kingdom (Foley *et al*, 2003).

It is likely that, for the foreseeable future, CDPs strategically located in or around transport terminals, petrol stations and convenience stores offer the best prospects of commercial viability. Collect +, a joint venture between delivery company Yodel and payments group PayPoint, was established in 2009. It utilizes a network of more than 5,250 convenience stores and petrol stations to which orders from retailers can be delivered, returned to and tracked. This has proved popular with pure e-tailers, such as Asos and multi-channel retailers such as our case study company Schuh (see Chapter 5). These initiatives appear to strike a reasonable balance between the conflicting demands of customer convenience, delivery efficiency and security. They can also integrate flows of B2C and B2B orders to achieve an adequate level of throughput. This has been the approach adopted by Amazon to combat the last mile problem with its Amazon lockers appearing in shopping centres and convenience stores in the United States and United Kingdom in the early 2010s. Asda also announced in 2012 that it was trialling lockers at railway stations to target the working commuter. Waitrose also plans to implement temperature-controlled lockers both in store and in remote locations by 2014.

Environmental impact of online retail logistics

Concerns have been expressed that online retailing is likely to generate more transport and impose a heavier burden on the environment than store-based retailing (Hesse, 2002). Some e-tailers, on the other hand, now advertise their service as being good for the environment. The British online grocer Ocado, for example, contends that each of its vans ‘takes 15 cars off the road’ (*London Evening Standard*, 20 June 2007).

Limited empirical data are available to test these conflicting claims, though much of it does suggest that, under certain circumstances, online retailing can be less damaging to the environment. Matthews *et al* (2001) compared the externalities associated with the distribution of books through a conventional retail channel and from an online bookseller and came to the conclusion that the latter was less environmentally damaging. According to their calculations, which included ‘trucking, air freight, production, packaging and passenger trips’, energy consumption, air pollution, greenhouse gas emissions and the quantity of hazardous waste were respectively, 16 per cent, 36 per cent, 9 per cent and 23 per cent lower in the case of online retailing. Following a review of nine European attempts to model the impact of online grocery retailing on traffic levels, Cairns (2005) concluded that:

If delivery vehicles directly substitute for car trips, the kilometers saved per shopping load are likely to be substantial – with reductions in the order of 70 per cent or more. Even with very stringent operating constraints or very low levels of customer demand, reductions of 50 per cent or more are predicted.

She, nevertheless, acknowledges that the use of grocery home services ‘by people who do not currently drive for food shopping, and increases in car use for other purposes, could counterbalance the travel reductions suggested by the models’ (p 82). Claims that online retailing is intrinsically ‘greener’ than conventional retailing appear premature, therefore, and require much more research. Edwards *et al* (2008) examine the methodological issues that have to be resolved when comparing the environmental impact of the two modes of retailing on a consistent basis.

Conclusions

Despite the collapse of the dot-com bubble at the turn of the century, online retailing has been enjoying steady growth throughout the last 12 years and this is predicted to continue. Much of this growth can be attributed to the improvements in online interactivity with the advent of Web 2.0, social media and m-commerce. Consumers can now shop anywhere, anyhow, anytime but despite these advances in communications, the same problems in relation to the ‘last mile’ and unattended delivery remain. Companies can

now communicate better with customers about time of delivery to the home and they provide more options to collect goods, for example click and collect. The future rate of growth, however, will partly depend on the quality and efficiency of the supporting system of order fulfilment. After a shaky start, many e-tailers have established effective logistical systems and built up customer confidence in the delivery operation. This has been most easily achieved in the non-food sector, where well-developed home delivery systems already existed and, in essence, only the ordering medium changed. E-grocery logistics has presented more formidable challenges. In retrospect, the initial rush to build dedicated pick centres appears reckless. Store-based fulfilment offers a surer path to market growth and profitability, though doubts remain about its longer term sustainability if online grocery sales continue to grow at their current rate. The more successful 'bricks and clicks' retailers may eventually have to invest in new facilities to accommodate future growth in the same way as Tesco has built picking centres in recent years. As consumers' commitment to home shopping strengthens they too are likely to start investing in home reception facilities, partly to liberate themselves from the need to 'stay in' for deliveries. Online retailers may also promote a switch to unattended delivery by passing on some of the resulting transport cost savings in lower delivery charges. This trend could be further reinforced by local authorities keen to constrain the growth in van traffic in urban areas and have more deliveries made during the night on uncongested roads. Much more research is required, however, on the relative environmental impact of the various forms of e-fulfilment reviewed in this chapter.

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The greening of retail logistics

10

Alan McKinnon and Julia Edwards

Introduction

Logistical activities are responsible for much of the environmental cost associated with modern retailing. For example, it has been estimated that trucking operations account for 10–15 per cent of total CO₂ emissions from retailing in the United Kingdom (British Retail Consortium, 2012). It is hardly surprising, therefore, that logistics features prominently in the environmental statements of large retailers. Most of these retailers have developed, or are in the process of formulating, environmental strategies. Some have been portraying themselves as ‘green’ for many years, often on the basis of a few minor cosmetic changes to their business practices. There is now much greater commitment to making retailing genuinely sustainable both in environmental and social terms. This stems partly from a requirement to demonstrate corporate social responsibility to investors and other stakeholder groups. It also reflects increased corporate awareness of the gravity of the environmental problems confronting the planet, particularly from global warming. As consumers are becoming more environmentally-conscious, retailers’ green credentials are becoming a more important competitive differentiator. Environmental initiatives can generate higher revenues and secure greater customer loyalty. They can also yield cost savings by, for example, cutting energy consumption and packaging waste. By happy coincidence, greening retail operations can represent best business practice both economically and environmentally.

In this chapter we examine the adverse effects of retail logistics operations on the environment and review a series of measures that companies can take to minimize them. The main focus will be on the lower links in the supply chain controlled by larger retailers with a logistics capability.

Environmental effects of retail logistics

These effects can be divided into six broad categories.

1. Greenhouse gas (GHG) emissions

Numerous gases exert a global warming effect with varying degrees of intensity. Carbon dioxide, produced by the burning of fossil fuels in power generation and vehicles, is the most important GHG emitted by retailers, though heavy users of temperature-control equipment also release refrigerant gases which can have a global warming potential thousands of times greater than CO₂ (HFC 23, for example, has global warming potential 11,500 times greater than carbon dioxide). Some large retailers have measured their 'carbon footprints' and disaggregated their CO₂ emissions by activity. Marks & Spencer, for example, has estimated that its logistics operations account for roughly 11 per cent of its total CO₂ emissions (Hill, 2007).

2. Noxious gases

These pollutants, such as nitrogen oxide, sulphur dioxide and particulate matter (PM10), impair local air quality and are responsible for a range of negative effects on human health, vegetation and buildings. Tightening controls on exhaust emissions over the past 20 years, mainly in developed countries, have drastically reduced the release of these pollutants.

3. Noise

This emanates mainly from vehicles and distribution centres (DCs). As a result of improvements in vehicle technology and the imposition of tougher regulations on vehicle noise, new trucks today are much quieter than those of 10–15 years ago. The electric delivery vans being increasingly used in retail delivery operations have engines that are barely audible. Noise abatement not only involves investing in newer vehicles with quieter engines. The sound of refrigeration equipment, the rattling of roll cages inside vehicles and even in-cab radios can cause annoyance. The range of activities performed in and around a retail DC can also disturb local residents, particularly as these premises typically operate on a 24-hour/seven-day cycle.

4. Accidents

The involvement of freight vehicles in traffic accidents is generally considered to be an externality. The costs of personal injury/death, any damage to property and related use of emergency services are borne by the community at large and thus deemed to be environmental costs. Accidents occurring within

distribution premises, on the other hand, are treated as an internal cost of the business.

5. Waste

Retailing generates large quantities of waste, mainly in the form of packaging material, though products that are damaged or life-expired while in the supply chain and have to be rejected can also be considered a type of logistics-related waste. In 2009, retailing and wholesaling in the United Kingdom produced 9.2 million tonnes of waste, roughly a fifth of all commercial and industrial waste (Jacobs, 2011). In the past much of this waste went into landfill sites, occupying rural land and creating serious environmental problems (such as the release of methane, a very potent GHG), or incineration plants that released air pollutants. Today retailers must adhere to strict controls on the recycling and re-use of packaging and other waste. UK retailers have managed to reduce the proportion of their waste dumped in landfill sites from 45 per cent in 2005 to 14 per cent in 2010 (British Retail Consortium, 2012). This has required the development of new reverse logistics networks for waste product.

6. Visual intrusion

Many citizens dislike the appearance of trucks and warehouses and believe that they reduce the quality of the local environment. Large trucks are often considered out of place and even intimidating in sensitive urban and rural environments, while large warehouse 'sheds' are often criticized for dominating the landscape. It is very difficult, however, to quantify and cost these subjective judgements and so, for this reason, they tend to be excluded from formal environmental assessments.

In this chapter we will focus on ways of reducing the environmental effects of transporting goods through the retail supply chain, though in a later section we also comment on the return of waste packaging and several other environmental issues of relevance to retail logistics.

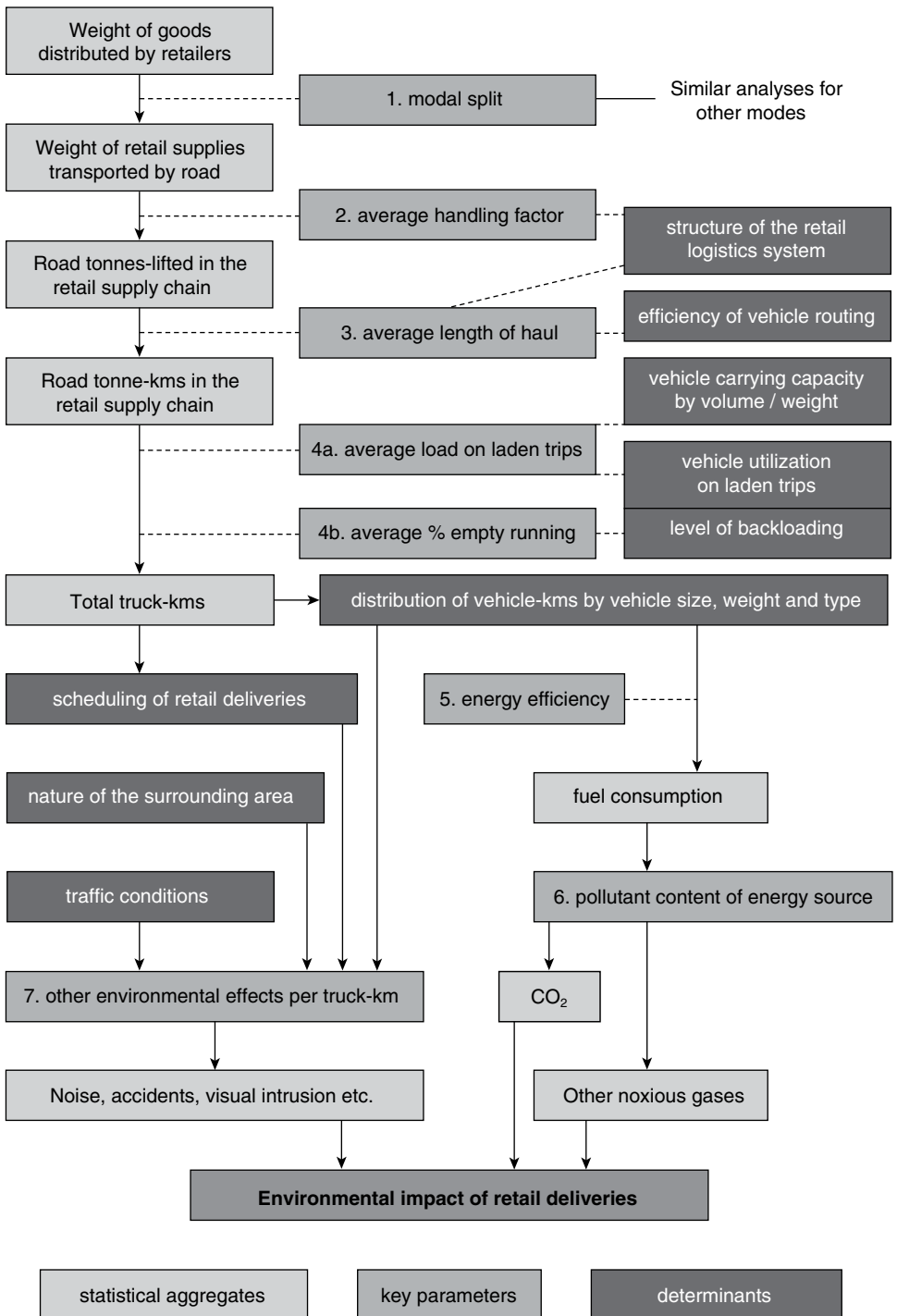
Framework for analysing the environmental impact of retail deliveries

The options for reducing the environmental impact of retail deliveries can be reviewed systematically within the framework shown in Figure 10.1. This framework, which was originally developed for the Green Logistics research project (a four-year research project being undertaken by six UK universities; for more details see: www.greenlogistics.org), has been adapted for retail logistics operations. It essentially maps the relationship between

the quantity of goods purchased by retailers and the environmental costs of moving them through the supply chain to the final point of sale. This relationship is defined by seven key parameters:

- 1** Modal split is the division of freight traffic between transport modes. The environmental impact of these modes varies enormously. Switching freight from air or road to cleaner modes, mainly rail or waterborne transport, can significantly reduce a retailer's environmental footprint. Following this modal split stage in the framework, subsequent parameters need to be calibrated for particular modes. As road is invariably the main transport mode used for retail deliveries, the rest of Figure 10.1 relates to this mode.
- 2** Average handling factor: this is a crude measure of the average number of links in a supply chain. It can be applied to the section of the supply chain controlled by the retailer. It might comprise a single link from the DC to the shop or several links in the case of retailers whose control extends back to the supplier's premises, who channel products through primary consolidation centres (PCCs) upstream of the DC and/or operate an additional tier of regional/local depots downstream of the DC.
- 3** Average length of haul: this is the mean distance that goods are transported on each link in the retail supply chain. It partly reflects the retailer's sourcing strategy, but also the geographical structure of its logistics system and the efficiency of vehicle routing. The conventional view is that by sourcing more products locally, retailers can cut their transport requirements and benefit the environment. As discussed later, however, lifecycle analysis reveals that minimizing the distance that goods are transported does not necessarily minimize environmental costs.
- 4** (a) Average payload on laden trips and (b) the proportion of kms run empty are two critical parameters relating to the utilization of vehicle capacity. By achieving higher levels of 'vehicle fill' retailers can reduce the amount of truck traffic required to move a given quantity of goods.
- 5** Energy efficiency: defined as the ratio of distance travelled to energy consumed, this parameter is affected by a range of factors including vehicle characteristics, driving behaviour and traffic conditions. By rescheduling deliveries to off-peak periods retailers can reduce their exposure to traffic congestion and allow the vehicles to run at more fuel-efficient speeds.
- 6** Pollutant content of the energy source: transport fuels differ in the amounts of particular pollutants that they emit. In the case of electrically-powered freight operations, there are also wide variations in the environmental impacts of different types of electricity generation. Converting from conventional diesel fuel to alternative

FIGURE 10.1 Analytical framework



fuels or to battery-powered vehicles recharged with electricity generated by renewable means (such as wind or water power) can significantly cut emissions of CO₂ and noxious pollutants.

- 7 Other environmental effects per truck-km: the other adverse effects which are not directly associated with energy consumption, such as noise irritation and accidents, vary with traffic conditions, the environmental sensitivity of the surrounding area and the nature of the vehicle. Upgrading vehicles to the latest environmental and safety standards and altering the scheduling and routing of deliveries can help to reduce the level of externalities per kilometre travelled.

We will now discuss most of these key parameters in more detail and outline measures that retailers can take to modify them in a way that benefits the environment. The environmental effects of rescheduling deliveries are discussed later as a 'topical issue'.

Choice of transport mode

Retailers can switch traffic flows to cleaner transport modes both on inbound (primary) movements into their DCs and outbound (secondary) deliveries to shops. In the case of supplies sourced from other parts of the world, the main choice is between air freight and deep-sea container services. According to NTM, the Swedish Network for Transport and Environment, long haul air freight services emit on average around 30 times more CO₂ per tonne km than ocean shipping. As a result of a process called radiative forcing, the global warming impact of high-altitude emissions is 2–4 times greater than greenhouse emissions at ground level. Although air transport is significantly more expensive than movement by sea, the difference in rates does not adequately reflect the huge difference in environmental costs. This is because no tax is currently imposed on the fuel consumed by air freight and deep-sea shipping services. Being a much more energy-intensive mode, air freight derives much greater economic benefit from this tax-free status. In a world subject to accelerating climate change, it is likely to be only a matter of time before this environmental anomaly is corrected. As a first step in this direction, the European Commission brought aviation (including air freight operations) into the European Emissions Trading Scheme in 2012. In the longer term, full internalization of the environmental costs of air freight, most of which are associated with climate change, could substantially increase air freight rates per tonne-km. When combined with steeply rising oil prices, the imposition of higher environmental charges will strongly discourage retailers from using air freight for all but the highest value, most time-sensitive products.

For the delivery of retail supplies over shorter distances, the modal options are generally road, rail and inland waterway services. Retailers have traditionally relied much more heavily on road freight services for three reasons:

- their DCs and shops have lacked direct rail (and waterway) connections;

- the distances between DCs and shops are usually too short for rail and waterborne services, which are essentially long haul modes, to be competitive;
- operators of rail freight and water-borne services have found it difficult to meet retailers' requirements for rapid and reliable delivery.

In recent years, however, major retailers have begun to make much more use of these alternative modes. In the United Kingdom, for example, Tesco, Asda and IKEA have switched significant volumes of longer haul traffic from road to rail. Tesco's four dedicated rail services remove approximately 14 million truck-kms annually from the road network and reduces CO₂ emissions by 15,000 tonnes per annum (Tesco, 2012). Tesco also transports wines and spirits by inland waterway in the north west of England. These modal shifts by UK retailers have been supported by government grants designed to make logistics operations more environmentally sustainable. These grants are only awarded where the economic case for the modal transfer is insufficient. There have so far been few, if any, examples of retailers in the United Kingdom opting for greener transport modes at the expense of higher delivery costs. The French retailer Monoprix, on the other hand, incurred additional costs of around 18 per cent in 2010 to serve its Paris shops by rail from a cross-modal hub on the outskirts of the city rather than deliver their supplies by road (Delaître and Barbeyrac, 2012). This example of a major retailer switching freight to rail is also unusual as it occurred at an urban scale and involves the movement of goods over short distances on the last link to the shops. It is estimated that Monoprix's rail-based delivery operation in Paris emits 49 per cent less CO₂ and other air pollutants than the previous distribution by road.

Structure of the retail logistics system

The number and length of links in the retail supply are so intimately related that it makes sense to discuss them together under the general heading of logistical structure. In recent years the structure of modern retail logistics systems has been criticized by some environmental organizations and other commentators for being fundamentally unsustainable (eg Sustainable Development Commission, 2008). They object in particular to the wide sourcing of products, the channelling of products through centralized DCs and the replenishment of products on a just in time/Quick Response (QR) basis. Some critics argue that long-term sustainability, particularly in a low carbon world, will only be achieved by a return to local subsistence economies, with consumption largely constrained to what can be produced locally. This would require a reversal of long-term retail trends and a return to the distribution systems of the early 20th century. Such a draconian transformation may ultimately be necessary if the gloomiest climate change scenarios were to materialize. We will confine our discussion here, however, to more modest changes to the structure of retail logistics systems, some of which are already underway and can still yield significant environmental benefits.

The consolidation of inbound supplies at retailer-controlled DCs improves the efficiency of shop deliveries and reduces their environmental impact. The alternative distribution model, which predated the development of retailers' logistics system and involved a multitude of suppliers delivering small quantities directly to each shop in the chain, was more damaging to the environment. For example, an analysis by McKinnon and Woodburn (1994) indicated that channelling grocery supplies through retailers' DCs in the United Kingdom cut CO₂ emissions by around 20 per cent relative to direct supplier deliveries to the shops.

In some retail supply chains, most notably clothing and temperature-controlled food, an additional tier of primary consolidation has been inserted upstream of the DC. This has been necessitated by the move to QR replenishment and diversification of the product range and supply base. While the addition of an extra warehousing operation and more circuitous routing of products via PCCs carry environmental penalties, these are likely to be offset by improved vehicle loading on the primary movements into DCs.

While primary consolidation has added a link to the retail supply chain, rationalization of the inward movement of imported goods can remove a link. In response to the huge increase in retail imports, mainly in deep-sea containers from the Far East, many retailers have been reconfiguring their inbound supply chains. Some UK retailers have adopted a 'port centric logistics' strategy, locating large DCs at the ports, serving their shops directly from there and, in many cases, eliminating a link from the supply chain. By 'destuffing' inbound containers at a 'on-port warehouse' UK supermarket chain Sainsbury was able to save '700,000 road miles for every 5,000 TEUs [twenty-foot equivalent units] handled' (Mangan *et al*, 2008, p). On the basis of a wider review of the environmental implications of port-centric logistics, McKinnon and Woolford (2011) conclude that, on balance, it is likely to reduce the carbon intensity of inbound container supply chains.

The greater the efficiency and capacity of the logistics system, the easier it is for retailers to source products from distant suppliers. The resulting lengthening of supply lines is often criticized for being environmentally damaging. In the United Kingdom, for instance, supermarket chains have been accused of extending 'food miles' by sourcing more produce from overseas, even when similar products are available locally. The food miles issue has been the subject of several major studies (eg Garnett, 2003; Smith *et al*, 2005). One conclusion to emerge from this work is that the distance a product travels can be a poor measure of its overall environmental impact. When a full product lifecycle analysis is conducted it is often found that products sourced from afar have lower environmental costs. This can occur where 'distant suppliers... operate more energy-efficient, less carbon-intensive production facilities than local suppliers and the resulting saving in production-related CO₂ exceeds the additional emissions from longer freight hauls' (McKinnon, 2008). Retailers can also cut these long-haul transport emissions by minimizing their use of air freight and maximizing the loading of sea

containers. The UK retailer Boots, for example, managed to reduce CO₂ emissions per cubic metre from the transport of imported goods from the Far East by 29 per cent between 2004 and 2007 mainly by switching from air to sea, consolidating freight in 40 foot rather than 20 foot containers and reducing the amount of handling at terminals (Barnes, 2007). Since 2007, many container shipping lines have reduced the average speed of their vessels, primarily to cut their fuel bills. This practice, known as 'slow steaming', has significantly reduced carbon emissions per TEU-km, particularly on the Far East–Europe trade-lane which is heavily used by European retailers (Cariou, 2011).

Utilization of transport capacity

Transport Key Performance Indicator (KPI) surveys conducted in the United Kingdom have assessed the loading of trucks carrying retail supplies (McKinnon, 2009). This has shown that loads transported by road at the retail end of the supply chain tend to have a relatively low density because of the nature of the goods, the high level of packaging, broad assortment of products and nature of the handling equipment. For this reason, they are constrained much more by the deck-area and cubic capacity of the vehicle than by the maximum weight it can carry. This is reflected by the fact that, in both food and non-food delivery operations, approximately three-quarters of the available vehicle floor area was occupied, whereas on average under 60 per cent of the weight carrying capacity was used. Around half the available space on the vehicles was actually used. The KPI surveys also found significant amounts of empty running by trucks in the retail supply chain. Approximately 11 per cent of the journeys made in the non-food retail sector were empty (Freight Best Practice Programme, 2006a). The corresponding figure for the grocery retailers was twice as high (Freight Best Practice Programme, 2006b). Although 23 per cent of their lorry-kms were run empty, this was below the national average of 26.8 per cent for all road freight operations in the United Kingdom at the time (Department for Transport, 2007). The remainder of this section will examine three methods of improving vehicle load factors and thus cutting truck-kms within the retail distribution system.

Backloading of shop delivery vehicles

Rather than return to the DC empty, a shop delivery vehicle can be routed via a supplier's premises to collect orders. The resulting triangular trip can eliminate two empty journeys, substantially reducing truck-kms, energy consumption and emissions. Some retailers also use their suppliers' vehicles to make outbound deliveries to their shops on their way back to the factory. Both practices require retailers to coordinate their primary and secondary distribution to ensure balanced loading of their vehicles. Some retailers

have tried to achieve this by adopting factory gate pricing and thus gaining control of the primary transport operation (Potter *et al*, 2007). Maximizing transport efficiency across 'network systems' comprising primary and secondary distribution presents formidable analytical challenges, however, and requires the application of complex software tools.

There are numerous constraints on the backloading of shop delivery vehicles (McKinnon and Ge, 2006). For example, companies have naturally given precedence to outbound distribution and been afraid that delays in the backloading operation might prevent vehicles returning in time to deliver the next outbound load. There has, nevertheless, been a significant growth of backloading in retail supply chains over the past decade. Across a sample of 10 UK food retailers, backhauls accounted for 5 per cent of total store delivery kilometres in 2006 (IGD, 2007). In 2010, one British supermarket chain was receiving 30 per cent of its inbound supplies as backloads (Freight Best Practice Programme, 2010).

Use of larger vehicles

Retail supplies in sectors such as grocery, clothing and footwear have a low density and thus 'cube-out' on vehicles before they 'weigh-out'. Increases in vehicle size can allow many retailers to consolidate loads on fewer trips, cutting vehicle-kms and emissions. The extra carrying capacity can either be gained by lengthening the vehicles or by increasing their height. In some countries, such as Sweden, Finland, Australia and the United States, the extra carrying capacity has been gained horizontally in longer trucks 25 metres or more in length (Organization for Economic Co-operation and Development/International Transport Workers' Federation, 2010). The British government has recently allowed some companies, including major retailers, to trial the use of articulated lorries 15 per cent longer than previously permitted (Druce, 2011). This is expected to yield significant economic and environmental benefits (WSP, 2010). UK retailers, and their logistics providers have also been able to gain extra carrying capacity vertically taking advantage of height clearances up to five metres, to double-deck their trailers. The benefits of using double-deck trailers is well illustrated by the case of a UK do-it-yourself retailer (Table 10.1). By replacing standard trailers with double-deck trailers on journeys from their DC in central England to shops in northern England, it cut vehicle-kms, fuel and CO₂ emissions by almost 50 per cent (Department for Transport, 2007).

Larger vehicles play a limited role in the delivery of supplies to shops in inner urban areas and tend to be used more for primary trunking between factories and DCs or DCs and local depots.

Urban consolidation centres

These centres can be used to consolidate supplies destined from shops in inner urban areas, integrated shopping centres and airports. Allen *et al*

TABLE 10.1 Travel distance, fuel and CO₂ savings from the use of double-deck vehicles

	Double deck vehicle	Single deck vehicles	Savings
Total distance travelled (miles)	275	532	257
Total fuel used (litres)	163.7	318.2	154.5
Total CO ₂ produced (kg)	440	854	414

SOURCE: Department for Transport, 2007

(2012) review 114 urban freight consolidation schemes in 17 countries, most of which have been designed to rationalize the delivery of goods to shops. By reducing the number of vehicles accessing retail centres these schemes can help to alleviate congestion and environmental impacts in the surrounding area. The final delivery leg, usually run within an agreed delivery schedule, is often performed by environmentally-friendly vehicles achieving much higher load factors than the direct shop deliveries that they replace. The main beneficiaries of these urban consolidation schemes tend to be small- and medium-sized retailers selling non-food products. One of the longest established urban consolidation centres was set up in 2004 on the outskirts of Bristol in the south-west of England. In 2009 it served approximately 70 retailers in the Broadmead area of the city centre (Allen *et al*, 2012). Vehicle movements to the participating retailers have been reduced by 75 per cent. They can also take advantage of additional value-added services, such as packaging and waste collection, and can access overspill storage facilities at peak times.

Energy efficiency of retail deliveries

Retailers and logistics service providers working on their behalf can improve the energy efficiency of transport and warehousing operations in many ways. Road freight operators can apply numerous fuel economy measures, which typically yield a 1–5 per cent fuel saving (Department for Transport, 2006a). These measures include:

- providing drivers with training in fuel efficient driving;
- offering incentives for fuel efficient driving;
- purchasing more fuel efficient vehicles;
- reducing the vehicle power-rating to match load weight and topography;

- reducing vehicle tare (empty) weight;
- improving the vehicle's aerodynamic profiling;
- raising standards of vehicle maintenance;
- imposing tighter speed limits; and
- ensuring correct tyre pressures.

Research in the United States, for example, found average fuel savings ranging from under 1 per cent for automatic tyre inflation systems to almost 8 per cent for a reduction in maximum speed from 65 mph to 60 mph (Ang and Schroeer, 2002). Some of these measures, however, are counteracting. For example, cutting maximum speed will reduce the effectiveness of improved vehicle aerodynamics. A fuel management programme should not, therefore, simply comprise a loose collection of measures. These measures should be integrated into a coherent package tailored to the needs of particular types of retail distribution. While many truck fuel economy measures are generic and can be applied in any sector, some have been pioneered by retailers. For example, in the United Kingdom, retailers such as Marks & Spencer, TK Maxx and PC World have trialled the use of 'tear-drop' trailers, which slope both at the front and rear of the vehicle. Companies using these vehicles typically claim fuel savings in the range of 2–5 per cent (McKinnon, 2012).

Use of alternative fuels

Biofuels

Biofuels have attracted increased attention in recent years as a result of concern about climate change and energy security.

However, government policies promoting the use of biofuels and corporate commitments to switch to these fuels now appear to have been premature. Recent life cycle (or well-to-wheel) comparisons of the environmental impacts of biofuels and conventional fuels suggest that the former are not a panacea as first thought. New evidence suggests that most forms of biodiesel, with the exception of that produced from waste vegetable oil, yield little net CO₂ benefit and, on a lifecycle basis, can potentially generate more CO₂ than conventional diesel. Other environmental and social effects of biofuel use are also being questioned (Royal Society, 2008; Environmental Audit Committee, 2008). The diversion of agricultural production from food to energy crops has substantially inflated food prices around the world and exacerbated food shortages. The increasing demand for biofuels is also accelerating the clearance of native tropical forests and threatening biodiversity. Second-generation biofuels, produced mainly from agricultural waste and forest products, may alleviate these environmental and social concerns and prove a more sustainable means of cutting CO₂ emissions. Commercial production of these fuels is still many years away, however, and even their effectiveness in achieving lifecycle carbon reductions has been

questioned particularly when indirect land use effects are taken into account (Gallagher, 2008).

Lifecycle analysis suggests that biomethane, made by the anaerobic digestion of food or agriculture waste, yields substantial net savings in GHG emissions relative to conventional diesel when used as a truck fuel (Atkins, 2010). The UK supermarket chain Sainsbury has trialled the use of this form of biofuel in several of its shop delivery vehicles.

Electric and hybrid vehicles

Electric vehicles are virtually pollution-free at point of use and extremely quiet. They are therefore particularly well suited to home delivery operations in which a large proportion of vehicle-kms are run in sensitive residential neighbourhoods. In assessing the overall impact of electric vehicles, however, one must take account of the primary energy source of the electricity used to recharge the batteries. In an effort to make its electric van operation carbon neutral, Tesco is installing wind turbines at some of its premises and 'feeding' sufficient energy into the electricity grid to offset that used in recharging vehicle batteries.

The adoption of electric vehicles has traditionally been constrained by their higher capital costs and the limited distance range between battery recharges and restrictions on vehicle carrying capacity imposed by the heavy weight of the battery.

Electric vehicles still offer less payload than conventional delivery vans, but now have a distance range of around 250 miles (which exceeds the normal daily range of most retail-related van deliveries).

A new generation of hybrid vans and rigid trucks, which can switch between battery and diesel/petrol-fuelled engines, is now being produced commercially. Their manufacturers claim that these vehicles can achieve fuel savings of 20–30 per cent when compared with conventional diesel/petrol vehicles. In the medium- to long-term they are likely to have extensive application in local distribution to shops and homes, though there is little prospect of hybrid technology being used in larger articulated trucks moving retail supplies longer distances between factories and DCs.

Managing waste within the retail supply chain

The efficient management of waste in the retail supply chain involves minimizing the use of packaging in the forward distribution channel and recovering waste packaging in the reverse channel.

Packaging helps to ensure that products reach the customer in a saleable, undamaged condition and can increase the efficiency of the distribution operation. It also, however, accounts for almost 20 per cent of UK household waste and, with enhanced environmental awareness among consumers and

TABLE 10.2 UK retailer packaging reduction initiatives

Asda	25% reduction in own labelling packaging by 2008
Morrisons	15% less own brand packaging
Sainsbury's	5% reduction by 2008
Tesco	25% reduction in own-brand by 2010
M&S	25% reduction in packaging by 2012

SOURCE: Bassett, 2007 and the corporate websites for the various retailers

tightening government regulations, retailers are coming under increasing pressure to minimize its use.

The answer is not to eliminate packaging altogether but to minimize its unnecessary use. Research has indicated that inadequate packaging can cause more product waste than over-packaging, as a result of damage occurring in the distribution channel (Institute for European Environmental Policy, 2004). A more recent pilot study has also revealed wide variations between food retailers in their use of packaging materials and in their ability to recycle it (Bassett and Charlton, 2007). Table 10.2 compares packaging reduction initiatives and targets of major UK food retailers in 2008.

In the reverse channel the main aim is either to recapture value through recycling or reuse, or to dispose of the waste in the most environmentally sustainable manner. It is now common practice for retailers to site resource recovery units (RRUs) at their DCs. Vehicles returning to the DCs, first call at the RRU where packaging is removed and baled, and any trays cleaned and stored for re-use. By handling packaging and handling equipment in this way, retailers not only maximize the amount of material recovered, but also exploit the backload capacity in returning shop delivery vehicles.

Topical issues

Night-time delivery to retail outlets

Daytime traffic congestion affects the reliability of retail deliveries, particularly as it is concentrated in and around urban areas where most shops are located. It not only impairs the efficiency of the distribution operation, but also carries a significant environmental penalty as vehicles consume

much more fuel per tonne-km on congested roads. A large proportion of deliveries to retail premises are made during the working day, often during the morning peak (McKinnon and Ge, 2004). This is partly necessary to stock the shops prior to the start of trading. It can also be due to night delivery curfews and local access restrictions imposed by local authorities. The UK Freight Transport Association (2006) has estimated that some 40 per cent of supermarkets in the United Kingdom are restricted by some form of night-time delivery curfew. If half of these curfews were relaxed, it would be possible to save around 63 million truck-kms annually and roughly 36 million litres of fuel.

Recently the UK government has been examining the possibility of relaxing night-time delivery restrictions in an effort to rationalize retail deliveries. Although complete elimination of night-time curfews would be both impractical and inappropriate, some relaxation in 'out-of-hours' restrictions, on a case-by-case basis, would help to ease daytime congestion and cut emissions (Department for Transport, 2011). Concern has been expressed, however, about noise disturbance to private dwellings in the vicinity of shops and DCs during the night. Delivery vehicles are, however, much quieter today than when delivery restrictions were first imposed. Ultra-quiet vehicles, with virtually silent fridge units, tail-lifts and roll cages/containers and wheels, have been developed which are well-suited to evening and night-time delivery.

Carbon auditing and labelling of products

Some major retailers, most notably Tesco, committed themselves to putting 'carbon labels' on the products they sell. These labels indicate the amount of CO₂ (in grams) emitted by a product during its production and distribution. It is argued that consumers concerned about climate change would then be able to make informed choices at the time of purchase, based on the emissions data supplied (Anon, 2007). The carbon-intensity of the supply chains for individual products would then become a selection criterion influencing the purchasing behaviour both of retail buyers and final consumers. In the United Kingdom, the Carbon Trust and British Standards Institute have developed a standard procedure for auditing carbon emissions across the supply chains of individual products (Carbon Trust, 2006).

Initial hopes that carbon labelling would eventually become universal for all goods and services now seem very unlikely to be fulfilled. Calculating the carbon footprints of individual products involves huge amounts of time, effort and cost (McKinnon, 2010). Some companies have reported costs of around £30,000 per product. Others have quoted average analysis costs per product of £3–£4,000. Even if this lower average proves more realistic, when multiplied by the 25–30,000 products stocked by the typical superstore, the cost of carbon auditing this range would total hundreds of millions of pounds. To date, only basic products comprising a few basic

ingredients have been carbon audited. Carbon auditing the supply chains of much more complex consumer products such as TVs, computers and cars presents a much more difficult and costly challenge. At the rate Tesco has been carbon auditing its product range it would take around 560 years to complete the process (Smithers, 2010). There would also be a need to update the carbon estimates regularly and to establish a system of independent validation. Such a high investment in product-level carbon auditing and labelling might be justified if it were likely to induce a major shift in demand to low-carbon products. The available evidence suggests, however, that this would not be the case (Uphall *et al*, 2011).

Relative environmental footprint of online retailing

In many countries online retail sales are growing faster than sales through conventional retail outlets. For distribution companies, the arrival of internet shopping has meant a shift in fulfilment strategies away from high-volume distribution to shops to direct delivery of individual customer orders to homes.

Some online retailers have been actively proclaiming the environmental benefits of online shopping (Smithers, 2007). The limited amount of empirical work on this subject has tended to substantiate these claims, though it is underpinned by numerous assumptions (Matthews *et al*, 2001; Cairns *et al* (2005); Siikavirta *et al*, 2005). A comparison of the environmental impact of the two forms of distribution is complicated by the broad range of factors that must be considered including the structure of the respective supply chains, the nature, loading and routing of the vehicles, the proportion of repeat deliveries to the home, the level of returns, the energy efficiency of shops and DCs and consumer travel behaviour. One of the key elements in the environmental appraisal is the extent to which personal travel, mainly by car, is replaced by van traffic. Under certain circumstances, the degree of substitution may be quite modest. After all, consumers frequently combine shopping trips with other activities such as the journey to and from work or the 'school run'. Also, a customer ordering online may then use their car for some other purpose during the time normally allocated for shopping. A comparative analysis of the carbon footprints of conventional and online retailing for books has, nevertheless, suggested that, on average in the United Kingdom, the latter is substantially less carbon-intensive (Edwards *et al*, 2010). Between the point at which the conventional and online channels diverge and the home, the amount of CO₂ emitted per book was approximately 8.3 times higher for conventional shopping by car and 2.8 times higher when the consumer travelled to the shop by bus. This calculation assumed that only one book was being purchased, the first delivery to the home was successful and the book was not subsequently returned. Relaxing these assumptions would erode some of the online channel's carbon advantage.

Conclusion

Large retailers have been a fertile source of logistical innovation. They have pioneered many logistical management practices and technologies that have subsequently been adopted in other sectors. The more progressive retailers also appear to be taking the lead in developing and implementing green logistics strategies. This chapter has outlined the numerous environmental improvement measures that they can incorporate in these strategies. If properly coordinated, this set of measures can substantially reduce the environmental costs of retail distribution. At present many of these costs are borne by the community at large and do not appear on the retailer's balance sheet. It is likely, however, that they will increasingly be internalized in higher taxes and/or through the inclusion of logistical activities in emissions trading schemes. Those retailers that by then have minimized the environmental footprint of their logistics operations will derive a significant financial benefit. They will also have benefited financially in the meantime as many of the green measures discussed in the chapter cut costs as well as emissions. Perhaps the most important driver of improved environmental practice in retail logistics, however, will be the growing expectation of customers that the products they buy are delivered in a sustainable manner.

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