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Introduction to Supply Chain Management and Logistics in a Volatile Global Environment

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Introduction

EDWARD SWEENEY

BACKGROUND AND RATIONALE

This book's title – *Supply Chain Management and Logistics in a Volatile Global Environment* – reflects a number of important facts. Firstly, the underpinning philosophy is one that recognises the strategic role of supply chain management (SCM) and logistics in the creation of competitive advantage. Furthermore, as a consequence of trends such as supply chain vertical disintegration and business globalisation, supply chains have become increasingly virtual and international. The focus of this book is on the achievement of competitiveness through the effective application of contemporary SCM and logistics thinking. The fact that failing to implement appropriate change inevitably results in a decline in the relative competitive strength of organisations (i.e. that 'standing still equals falling behind') underpins the focus of the constituent chapters. In a rapidly changing economic and business environment innovation is the key to ensuring that competitive strength is sustained and built upon.

The late twentieth century saw significant changes in the structure of the world economy and brought with it new challenges in all aspects of business and operations management. The trend towards globalisation of enterprise is likely to continue into the twenty-first century and beyond. SCM, with its focus on achieving the service levels demanded by markets and on optimising total supply chain cost and investment, has a potentially pivotal role to play in addressing these challenges. The recent economic volatility has provided a fresh impetus in terms of building the necessary supply chain strategic capability in a proactive and focused manner. For this reason the book focuses on the strategic role of SCM and logistics in building the capability necessary to succeed in this challenging environ-

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ment. Against a background of increasingly rapid and at times discontinuous change we need to consider the broader value of SCM in creating a *differentiated business model* that determines competitive advantage in the judgement of customers. Economic turbulence and volatility has sharpened the focus in relation to these issues.

DEFINING SUPPLY CHAIN MANAGEMENT AND LOGISTICS

Background

It is appropriate at this point to define SCM and logistics by way of context for the detailed exploration of the various issues contained in this book. Before doing so, a number of important points need to be highlighted.

A plethora of SCM definitions have been developed since the introduction of the term by management consultants in the early 1980s (Oliver and Webber, 1982). This may, of itself, limit management's understanding of the SCM concept and the practical effectiveness of its application (as noted by Ross, 1998). Furthermore, a range of – often quite complex – SCM language and terminology has evolved over the years. Given that there are many bodies of literature associated with SCM, this should not come as a major surprise. Croom et al. (2000), for example, identify eleven subject areas considered to be core to any SCM literature review.¹ Mentzer et al. (2001) refer to 'confusion' (2001: 2), 'ambiguity' (2001: 3) and 'a need to examine the phenomena of SCM more closely in order to define the term and concept' (2001: 3); Lambert (2004) notes that there is a great deal of confusion regarding exactly what SCM involves; Croom et al. note that, despite the existence of SCM since the early 1980s, 'conceptually the management of supply chains is not particularly well-understood' (2000: 68). Furthermore, many of the SCM definitions in the literature attempt to provide a single-sentence definition. In the author's view, the results are, almost inevitably, achievements in verbal and linguistic dexterity rather than definitions that are likely to add clarity from an SCM application perspective. The author's experience of using such definitions in recent years as part of executive education programmes in SCM has reinforced the validity of this view.

The author's definition of SCM is based on the *Four Fundamentals*, which are described in detail elsewhere (Sweeney, 2007). This construct represents an attempt to concisely yet comprehensively define the essence

¹ Purchasing and supply; logistics and transportation; marketing; organisational behaviour, industrial organisation, transaction cost economics and contract view; contingency theory; institutional sociology; systems engineering; networks; 'best practices'; strategic management; and economic development.

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of the subject. It is directed primarily at a practitioner audience and aims to bring clarity and understanding to the issue. The avoidance of jargon and complex language is an element of this. It seeks to describe the main constituent elements of SCM, as well as positioning SCM in the overall corporate strategic framework. Furthermore, it aims to provide a definition that is intelligible irrespective of the functional background, business sector or geographical location of the practitioner. Finally, the *Four Fundamentals* are relevant to supply chain professionals irrespective of their level of experience and/or seniority in industry. The following sections briefly describe each of the *Fundamentals* in turn.

Fundamental One: Setting SCM Objectives

The objectives of SCM are to meet or exceed the required or demanded customer service level in targeted markets or segments and to optimise total supply chain investment and cost. This service/cost approach has long been regarded as central to SCM. This approach requires companies to have a clear understanding of both issues. Customer service requirements, dictated by the marketplace, 'set the spec' for the supply chain. Achieving this level of service at the optimal cost focuses attention on the elimination of 'non-value-adding activities' (NVAs) throughout the supply chain.

Fundamental Two: SCM Philosophy

Every product or service is delivered to the final consumer (the only source of 'real' money in the chain) through a series of often complex movements between companies that comprise the complete chain. An inefficiency anywhere in the chain will result in the chain as a whole failing to achieve its true competitive potential. In other words, supply chains are increasingly competing with other supply chains rather than, in the more traditional axiom, companies simply competing with other companies. The phrase 'supply chain' is used to indicate that the chain is only as strong as its weakest link.

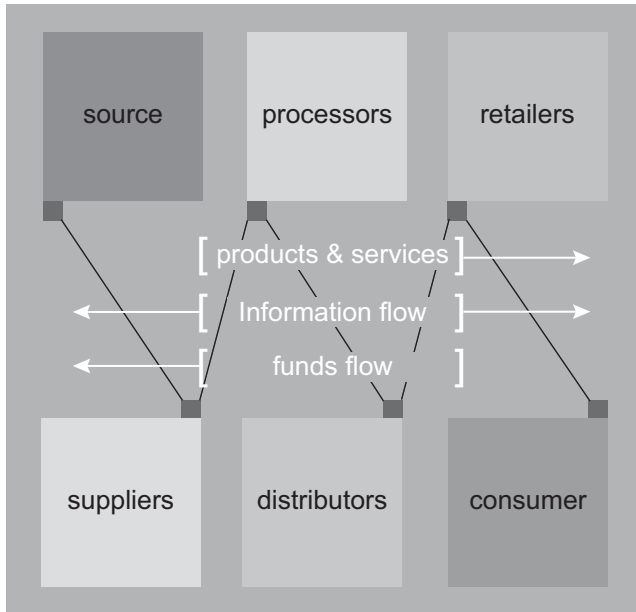
The representation in Figure 1.1 of a 'macro' or 'external' supply chain shows materials flowing from the raw material source through the various stages in the chain to the final consumer. Money then flows back down the chain. The point is that every link matters and that value is added, and profit generated, at each link along the way.

Most businesses can be described in terms of the five functions: 'buy', 'make', 'store', 'move' and 'sell'. This is known as the 'micro' or 'internal' supply chain as shown in Figure 1.2.

Traditionally, these functions have been managed in isolation, often working at cross purposes. SCM means thinking beyond the established

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Figure 1.1: The External Supply Chain



Source: Sweeney (2007: 52), reproduced with permission.

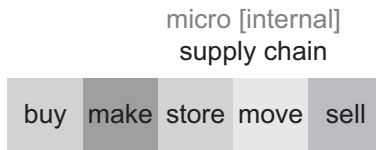
Figure 1.2: The Internal Supply Chain



Source: Sweeney (2007: 50), reproduced with permission.

boundaries, strengthening the linkages between the functions, and finding ways for them to pull together. A recognition that the whole is greater than the sum of the parts calls for more effective integration between purchasing and procurement ('buy'), production planning and control ('make'), warehouse management ('store'), transport operations ('move') and customer relationship management ('sell'), as illustrated in Figure 1.3.

Figure 1.3: Integrating the Internal Supply Chain



Source: Sweeney (2007: 50), reproduced with permission.

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Fundamental Three: Managing the Flows

For a supply chain to achieve its maximum level of effectiveness and efficiency, material flows, money flows and information flows throughout the entire chain must be managed in an integrated and holistic manner, driven by the overall service and cost objectives. The view of a macro chain shown in Figure 1.1 indicates the way in which material, money (funds) and information flow between the companies that participate in the chain. Similar logic can be applied to the functions that comprise the micro chain. It can be argued that managing the information flows is the most critical of these activities. This is because the flow or movement of materials or money is usually triggered by an associated information movement. Effective management of material and financial flows is, therefore, predicated upon the effective management of the related information flows. For this reason, information and communications technology (ICT) is becoming an increasingly important SCM enabler.

Fundamental Four: Relationship Management

Finally, this holistic approach often requires a reappraisal of the way in which both internal and external customer and supplier relationships are created and managed. SCM is not a 'zero-sum' game based on adversarial relationships. Rather, it needs to be a 'win-win' game based on collaborative approaches. This point is relevant to the interactions between the key 'internal' supply chain functions of buy, make, store, move and sell, as well as to relationships between an organisation and its external customers and suppliers. One of the biggest manifestations of the application of supply chain philosophy in recent years has involved the move away from adversarial relationships with key external suppliers towards relationships that are based on mutual trust and benefits, openness, and shared goals and objectives.

SCM and Logistics

There are various views regarding the relationship between SCM and logistics. Larson and Halldorsson (2004) identify four conceptual perspectives on SCM versus logistics. The *traditionalist* school positions SCM in logistics: that is, SCM is just one small part of logistics. The *relabelling* perspective simply renames logistics: what was logistics is now SCM. The *unionist* perspective treats logistics as a part of SCM: SCM completely subsumes logistics. Finally, the *intersectionist* perspective is described as follows:

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The intersection concept suggests SCM is not the union of logistics, marketing, operations management, purchasing and other functional areas. Rather, it includes strategic, integrative elements from all of these disciplines. For instance, in the purchasing area, negotiating a long-term arrangement is a strategic element and transmitting a purchase order is tactical. The supply chain manager would be involved in the negotiations, but not the purchase order transmission. Similarly, in the logistics area, hiring a third-party logistics (3PL) provider is a strategic decision, while picking and packing in the warehouse are tactical. At the intersection, SCM co-ordinates crossfunctional efforts across multiple firms. SCM is strategic, not tactical. (Larson and Halldorsson, 2004: 21)

Whilst each of these approaches is valid in its own way, the research of Larson and Halldorsson (2004) indicates that the unionist view is the most widely adopted by scholars. The empirical evidence of Lummus et al. (2001) suggests a similar perspective amongst practitioners. Based on a small sample of manufacturers, retailers and 3PLs they concluded that:

Logistics is generally viewed as within one company, although it manages flows between the company and its suppliers and customers. Supply chain management includes the logistical flows, the customer order management and production processes and the information flows necessary to monitor all the activities at the supply chain nodes. (Lummus et al., 2001: 431)

In short, their evidence suggests that logistics is largely viewed as effectively a subset of SCM.

The *Four Fundamentals* construct could be regarded as 'unionist intersectionist'. It is unionist in that it does view logistics as one element of the wider SCM field. Logistics, with its primary focus on the effective and efficient movement and storage of materials, plays a critical role as part of *Fundamental Three*. Nonetheless, the strategic and integrative role assigned to SCM by the intersectionist perspective is in line with the *Four Fundamentals*, in particular *Fundamental Two*. The concept of using SCM as a source of strategic leverage is in line with this view. This relates directly back to the need for clear SCM objectives – as articulated in *Fundamental One* – which link directly with the overall corporate mission and objectives of an organisation.

Summary

The author believes that the *Four Fundamentals* concisely yet comprehensively define the essence of SCM as it has evolved from a variety of

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disciplines over time. In this regard, questions need to be raised regarding the extent to which an understanding of SCM, as contained in such a definition, is a prerequisite for effective implementation. As noted by Fawcett and Magnan (2002):

SCM definitions vary widely from company to company and even from manager to manager within the same company. As a result, not only do SCM practices lack cohesion and visibility but supply chain strategies lack specificity and reach. Managers must be precise in their discussions of specific practices – this is true both within the firm and among channel members. (2002: 359–360)

In a similar vein, Mentzer et al. made the point that ‘without a clear understanding of SCM, we cannot expect wide application of SCM in practice’ (2001: 19). Furthermore, and as noted earlier, Ross (1998) suggested that the complicated terminology often used in discussions of SCM can limit management’s understanding and its effectiveness for practical application. The *Four Fundamentals* aids the development of such an understanding.

BOOK OVERVIEW

Introduction and Rationale

Part I of this book examines globalisation from an SCM and logistics perspective. A key lesson from this is that firms increasingly need to be competitive at an international level (or to be ‘world class’) and in many cases this requires a strong focus on robust approaches to supply chain design (the focus of Part II). The evolution of SCM thinking has been characterised by a number of paradigm shifts in management behaviour and practice. One major shift has been the move away from a purely transactional view of customer–supplier interactions to an approach that is based on effective relationship management. Part III explores this trend, with specific reference to the key overall aim of SCM: integration or synchronisation of supply and demand. Recent years have seen rapid developments in ICT. These developments have facilitated significant changes in the way in which organisations view SCM and, in particular, this key goal of supply chain integration (SCI). Part IV is concerned with the evolving role of ICT in the establishment and management of supply chain and logistics configurations. Finally, the changing SCM landscape has presented a range of logistics challenges for firms, many of which relate to the need for improved performance from an environmental perspective. Part V discusses some of these challenges, in particular the issues of sustainable logistics and on-shelf availability (OSA) in the retail sector.

Globalisation: The SCM and Logistics Perspective

Part I (Chapters 2 and 3) recognises that growth in international and global operations has been a major feature of business during the past three decades. In essence, as competitiveness shifts away from the traditional product-service-market mix towards the overall business model, SCM is moving into the centre of strategy formulation – and this constitutes the central focus of Chapter 2.

In this context, the question can be asked, what is the role of the individual country or nation state? Is it a passive host for nodes of individual supply chains, or can it play a key, proactive role in such supply chains? Do its logistics systems *lubricate* global supply chains and are such systems integrated into global logistics systems? Chapter 3 seeks to answer these questions with particular reference to the case of Ireland. To set the scene, the various key trends are first detailed; in addition, data from some of the indices of relative national logistics performance (such as the World Bank Logistics Performance Index) are also outlined. The chapter explains Ireland's current position in global logistics systems and how this positioning is likely to evolve in the future.

Supply Chain Design

Over the last four decades of their development, supply chains have worked within the constraints of conventional, functional organisation designs. However, in more recent times, as customer demands for increased responsiveness have grown almost exponentially, they have exposed the weakness of this design. Chapter 4 introduces the reader to the concept of 'dynamic alignment' and explains how new, emerging organisational formats can lead to the required improvement in supply chain responsiveness. Examples of companies already using such approaches are reviewed.

The recent turbulence in markets around the world has highlighted the interconnectedness of modern global supply chains. As a result of outsourcing and offshoring, companies now find themselves at the centre of a network of suppliers, original equipment manufacturers (OEMs), distributors and customers. These networks have become more complex and with this complexity comes risk and vulnerability. Chapter 5 argues that the management of this complexity requires the development of agile capabilities within the business and across the supply chain. The concept of supply chain agility is discussed and the inhibitors and enablers of agility are described. A framework is advanced for the development of a supply chain that is better able to cope with volatility and uncertainty.

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Chapter 6 starts by outlining the sources and drivers for supply chain risk and progresses with a discussion on building the *resilient* supply chain – the main focus of the chapter. The four key areas that need to be addressed in building a resilient supply chain are outlined: effective supply chain design, the building of collaborative supply chain relationships, the creation of supply chain agility, and the development of a supply chain risk management culture. It goes on to discuss some of the operational actions that managers can take to reduce the risk profile of their supply chain environment.

In the context of supply chain design, questions related to the geographical origins of products (i.e. where does stuff come from?) turn out to be far more complex, and of much greater significance, than one might imagine. Chapter 7 sets out some of the reasons why questions of provenance and traceability are important and examines some of the challenges that face practitioners and researchers in this regard.

The changing business environment has sharpened the focus on the need for robust approaches to supply chain improvement. This is particularly the case in Ireland, which has the natural disadvantage of a location peripheral to significant markets and sources of raw materials, resulting in relatively high transport and distribution costs. Chapter 8 outlines some of the key characteristics of SCM excellence and goes on to review current levels of diffusion of SCM based on a large survey of firms in Ireland. The empirical results suggest that there is a need for more widespread adoption of SCM among Irish firms. Based on the performance of firms in relation to the key characteristics of SCM excellence, a number of critical success factors (CSFs) for effective supply chain re-engineering are identified and the key elements of a roadmap are proposed. Finally, a number of research and managerial conclusions are drawn.

From Transactions to Relationship Management in the Integrating Supply-Demand Chain

In successful purchasing relationships effective communication is a key factor. The purpose of Chapter 9 is to explore whether the choice of communication media is affected by different stages in the relationship development process and by different purchasing contexts, i.e. product and service purchasing. The chapter initially reviews the literature on inter-organisational communication and purchasing relationships. In order to explore the issue in question, data is presented that was gathered through semi-structured in-depth interviews with purchasing managers, buyers and their suppliers in three product and three service purchasing relationships. The chapter goes on to identify a relationship development

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framework that influences the communication media selection in two purchasing contexts.

Chapter 10 presents a review of the literature on the evolution of purchasing and supply concepts converging towards SCM over the last few decades. Particular attention is devoted to the role of supply systems and the supplier selection process. This chapter illustrates the lessons using a case study and discusses future improvements to the supplier selection process. This takes into account the potential competitive advantage that can be derived from the management of an efficient and effective supply chain as a result of the adoption of a service-oriented strategy approach rather than a traditional product-oriented approach.

In Chapter 11, the implications of service-dominant (S-D) logic on SCM practices is considered. The chapter discusses whether or not traditional SCM thinking can be applied to sourcing, managing and/or developing services in the channel or whether a new 'services supply chain logic' needs to be considered to reflect the unique characteristics of services. This builds on the service-oriented perspective introduced in Chapter 10.

The Role of Technology in Contemporary Supply Chains

It is clear that recent developments in ICT have facilitated significant changes in the manner in which organisations view SCM and, in particular, the key goal of supply chain integration. Part IV (Chapters 12 and 13) explores two critical ICT issues in detail.

The trend towards the outsourcing of significant elements of logistics functionality (vertical disintegration) by an increasing number of manufacturers and retailers has characterised the contemporary business environment in recent years. As a consequence, third-party logistics service providers (3PLs) have been forced to re-think their business configurations, seeking a more integrated approach with customers through expanding their role in the supply chain. Within this process, while large 3PLs are gaining substantial benefits from technology usage, the nature of changes resulting from ICT usage in small 3PLs remains unclear. The aim of Chapter 12 is to outline the state of knowledge in the area of ICT innovation in the logistics service industry.

With the rise of ICT, an important class of products has emerged – digital products – that cannot be described as physical as they do not obey commonly understood physical laws. Given the strategic importance of digital goods, Chapter 13 assesses the characteristics and elements of digital product supply chains, from initial product creation through to their distribution to the end consumer, by building a conceptual digital supply

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chain framework, including factors affecting innovation and innovation cycle management.

Evolving Logistics Challenges

Chapter 14 considers what changes will have to be made to logistics over the next forty years to meet the 50–80 per cent carbon dioxide (CO₂) reduction targets for 2050 that are now being set by national governments. It estimates the current carbon footprint of logistics operations and its allocation between different activities and transport modes. 'Business-as-usual' projections of freight transport trends are converted into forecasts of CO₂ growth to show the extent of the trend reversal that will now be required. The measures that will be likely to decarbonise logistics most cost effectively, including modal shift, improved vehicle design, load consolidation, increased fuel efficiency and the switch to battery power and biofuels, are then considered.

In this context, an 'Environmental Zone' (EZ) is a defined geographical area that can only be entered by vehicles meeting certain emissions criteria. The purpose of an EZ is to either restrict or charge the most polluting vehicles if they enter the EZ, thereby leading to air quality improvements. Chapter 15 discusses the following topics: EZ definition, policy approaches concerning EZs, EZs in European towns and cities, European Commission and national legal frameworks for EZs, operator behaviour and costs as a result of EZs, and the benefits of EZs.

Finally, Chapter 16 argues that on-shelf availability (OSA) remains a key challenge for all retailers and reviews efforts to date regarding this issue. As noted in the chapter, out-of-stocks (OOSs) result in customer dissatisfaction and cost retailers across Europe about €4 billion annually in lost sales. Despite a body of work by various academic and practitioner groups across Europe, OSA and OOSs continue to pose problems for grocery retailers and recent mass media investigations have returned these issues to the forefront of management attention. However, some initiatives involving internal retailer processes and external collaboration with suppliers are providing positive results. Chapter 16 reports on several of these initiatives in a UK and Irish context as a guide for other grocery retailers to consider and possibly adopt.

Other Observations

The final chapter (Chapter 17) reflects on the *Four Fundamentals* in the light of the detailed issues introduced in each chapter. It looks ahead and sets

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out a number of key emerging challenges that are likely to play a significant role in the design and management of the successful supply chain architectures of the future. As noted in the preface, this book is intended to be read equally profitably by students, researchers and business managers. Each contributor brings unique insights based on the nature of their experience and expertise. These insights are all potentially of value and the challenge for the reader is to relate the different emphases and priorities inherent in these perspectives to their own issues and strategic imperatives.

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