

# Preface

Viewed from the perspective of history, supply chain has been around for a long time. Even in prehistoric times, logistics was pressed into service in the conduct of war. Many accounts of electronic commerce have tried to locate the roots of commerce by discussing the famous Silk Route. Supply chain began to acquire immense significance in world history with the advent of capitalism and colonialism. The idea of international division of labour was systematically applied to obtain raw materials from the colonies to feed the factories of the colonial masters, and to export manufactured goods to the colonies. Such a canned version of history of supply chain management (SCM) serves as a gentle introduction to illustrate the economic, political, societal and global significance of SCM. Of course, the details of such impacts would not be the same today with Internet-based SCM. But we believe that modern day SCM continues to influence the economic and political landscape while it is shaped by the wide array of forces known collectively as globalization. It is beyond the scope of this short preface to do full justice to such big issue. Indeed, it will require many volumes to provide the stage for the complexity and fascinating nature of the topic to be revealed in its full glory.

What we set out to do here is much more modest. We want to contribute to this interesting global phenomenon by collecting together in one volume well-researched works that illuminate SCM issues in the e-business environment in varying degrees of brightness and from various angles. This task is not easy, for our call-for-paper has to compete with a host of high quality journals and conferences. In order to select a meaningful theme, we begin by asking ourselves what may be conceived as pretty distinctive in current SCM as opposed to what was in good currency some years ago. Three observations come to mind. First, it has often been noted that the e-business environment has brought

about a new kind of competition. Instead of the traditional mode of firms competing against firms, we have now supply chains competing against supply chains. This has brought about a very complex and intriguing relationship between the core firm of a supply chain and other members. Second, for those of us schooled in the competitive model of Michael Porter, we cannot help but notice that in an SCM environment, Porter's competition represents only one side of the proverbial coin. In fact, the current business landscape has many stories of business firms competing in one project and cooperating in another related project, and they do so at the same time. Even more interesting is that certain members of these firms are involved in both projects. The point suggested here is that Porter is not so much wrong as incomplete. Third, the nature of competence has changed. Traditionally, competence of a firm refers to its ability to produce quality goods at low costs. What is in good currency today refers to a firm's ability to identify the right suppliers to execute a given activity in the value chain, to organize such activities, and to manage its relationship with these suppliers. It is with this new business landscape in background that we frame the title of this book as *Supply Chain Management: Issues in the New Era of Collaboration and Competition*.

The layout of this book is based on the four major aspects in SCM: impacts and challenges, the role of the SCM participants, the implementation of channel integration, and performance control and risks.

## **Section I: The Impacts and Challenges of Supply Chain Management**

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**Chapter I** reviews the literature of SCM from several angles that can be the basis of a proposed framework for the SCM knowledge within academic and managerial contexts. By introducing the supply chain operations reference (SCOR) model, which was developed by the Supply Chain Council and is recognised as a diagnostic tool for SCM worldwide, the chapter identifies the limitations of contemporary SCM design and implementation. This chapter surveys the literature of performance control and risk issues in SCM and SCOR model and discusses the proposed framework for the future research. This chapter implies the needs of further investigation of the above areas, which explains the layout of this book.

**Chapter II** is a preliminary investigation into the development barriers of a virtual enterprise network in the Creative Digital Industries sector in South Yorkshire, United Kingdom. The authors contend that the key factors in delivering an integrated virtual value chain are trust and the control of risk by taking the concept of virtual organization as its theoretical basis. They have provided

the evidence of the connection between trust and the control in the context. On the one hand, the three dimensions—competence, integrity, and benevolence of trust—were used by the small and medium enterprises (SMEs) in this study as the criteria for choosing their business partners. On the other hand, risks such as poaching, stealing, transaction-specific, information asymmetries, and loss of resource control were confirmed by these SMEs as the main concerns that led to their resistance to participation in a virtual value chain. They suggest that managers should pay attention to trust building and the control of risks at all stages while developing and participating in a virtual value chain based on the research result.

**Chapter III** focuses on downstream information flows by interviewing six major stakeholders in the meat supply chain of New Zealand to determine their information needs and the information they provide to their downstream partners. It is one of the few supply chain studies in the agricultural industry, which is quite different from the service industry and manufacturing industry. Drawing attention to the impact of livestock diseases, it details the various information flows and information media used, identifies redundancies and deficiencies, and makes recommendations for improvements.

**Chapter IV** provides a framework to identify the issues related to how virtual integration along the supply chain can affect the channel coordination. It surveys the related supply chain integration literature, theoretical foundation, and research frameworks and then develops the research hypotheses and a structural model. The model is tested with adequate research method and measurement, followed by statistical data analysis in order to show the interrelationships between influential factors. This study suggests that information and communications technology (ICT)-enabled collaboration can be regarded as alternative governance mechanism, that is, virtual integration. With ICT-enabled collaborative operation, execution, and process planning and control, virtual integration supports both value creation and transaction cost reduction. Therefore, virtual integration is a particularly effective and useful governance mechanism for integrating supply chain under the condition of significant asset specificity.

## **Section II: The Participants' Roles in Supply Chain Management**

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**Chapter V** analyzes the effects of increased transparency in supply chain and business network. The chapter differentiates three levels of transparency: history transparency, operations transparency, and strategy transparency. Using an example in the Dutch egg sector, the chapter shows how the role of the

individual company changes in a supply chain and discusses the implications. Though technology push makes transparency feasible and economically attractive, social-psychological barriers exist. A brief review of cases from several continents shows that these barriers vary across cultures, depending on prevailing attitudes towards relationships and authority. Transparency may run counter to tradition, to trust and to entrepreneurial freedom in the supply chain, but it also offers opportunities for creating supply chains that are profitable for all participants. To grasp these requires vision on the part of those involved.

**Chapter VI** develops an integrated framework for global SCM as viewed from the strategic aspects of small and medium-sized enterprise (SME) suppliers. Primary consideration is given to characteristics of the integrated supply chain and the necessity for adaptation in managing the supply chain in order to attain competitive advantage. A review of the current literature and an analysis of the supply chain in changing global markets emphasize the relative importance of strategically managing the supply chain process given the limited resources of the SMEs. Managing the supply chain through the development of market-specific strategies allows an SME to be proactive as opposed to reactive in its strategic planning, which can greatly benefit customer satisfaction levels and thus enhance the performance of the firm.

**Chapter VII** explores novel ways of improving flexibility, responsiveness, and competitiveness via strategic IT alliances among channel members in a supply chain network. To gain competitiveness, firms have to constantly update their operational strategies and IT through collaborative efforts of a “network” of supply chain members rather than through the efforts of an individual firm. The foci of the chapter are: (1) an overview of SCM issues and problems, (2) supply chain coordination and integration, (3) the latest IT applications for improved supply chain performance and coordination, and (4) strategic IT alliances.

## Section III: Implementation of Channel Integration

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While the benefits of adopting inter-organisational supply chain management (IOSCM) have been widely reported within industry, its adoption has been slow and below industry expectations. There is lack of theory within the literature to explain this problem in IOSCM initiatives adoption. Employing an inductive case-study approach to theory building, **Chapter VIII** develops a process model that captures the complexity of intra-industry interactions in the course of adoption and argues for a normative path to achieve the increasing levels of integration envisioned in IOSCM. The model proposes three sets of requirements that have

to be met to achieve a certain level of integration: supply chain integration, inter-organisational structures, and relationship intimacy. However, to achieve the higher levels of integration, it is necessary to have mastered the lower levels of integration demanded by earlier initiatives. This path dependence constitutes a major barrier to adoption of more advanced IOSCM initiatives.

Good communication systems between organisations increase customer satisfaction and relationship behaviour in SCM. However, not much is known about the details of how information is used to manage relationships and coordinate customers and suppliers. In earlier stages of the research, a dynamic model of inter-organisational information management systems (IOIMS) and relationships was developed. An evaluation of this model was based on a survey of Australian food processors and a case study. **Chapter IX** also reports an evaluation of a revised version of this model. A strategic oriented IOIMS was positively associated with IOIMS satisfaction, which was in turn positively associated with perceived current outcomes (satisfaction with performance, perceived responsiveness, and strength of relationship trust). However, (attitudinal) commitment to developing long-term customer/supplier relationships was not significantly associated with the IOIMS, IOIMS satisfaction, or current outcomes. Results were moderated by the nature of the business environment—power/dependency, experience, and market uncertainty.

**Chapter X** reflects upon techniques that might facilitate improved strategic decision making in an SCM environment. In particular, it presents the integration of a selection of techniques adapted from the soft systems methodology (SSM). The results indicate that SSM techniques can complement existing SCM decision-making tools. In particular, this chapter outlines a framework for integrating some SSM techniques with approaches based upon the supply-chain operations reference model.

To gain competitive advantages, e-enterprises need to integrate the entire lines of business operations and critical business data with external supply chain participants over the Web. However, this introduces significant security risks to the organizations' critical assets and infrastructures. **Chapter XI** reports a case study of e-service security design and implementation at a leading U.S. company. It reviews security concerns and challenges in front-end e-business and back-end supply chain operations. This is followed by an analysis of the company's e-service and its security problems. The case then presents an integrated e-enterprise security methodology to guide the company toward meeting its security needs. The results provide IT security professionals with practical steps and sustainable solutions for tackling the unique security challenges arising in an open, unbounded e-enterprise supply chain environment.

## Section IV: Performance Control and Risk Issues

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Increasing strategic importance of logistics related processes demands higher integration of performance management and SCM. **Chapter XII** goes beyond existing work and develops an understanding of the issue of performance management from an SCM perspective. The aim is to understand how today's manufacturing systems and processes could be measured and managed in the context of the extended business—back through the supplier chain and forward into the distribution and customer chain. The chapter's major outcomes are a clearer understanding of the concept of SCM through performance, and a process for designing a supply chain performance measurement system.

**Chapter XII** introduces a game-theoretic approach to supply chain risk management. The study described focuses on the risk of a single supply chain member defecting from common supply chain agreements, thereby jeopardizing the overall supply chain performance. It introduces a manual supply chain game, by which dynamic supply chain mechanisms can be simulated and further analyzed using a game theoretic model. The model helps to identify externalities that negatively impact supply chain efficiency. Incentives are necessary to overcome these externalities in order to align supply chain objectives. The game theoretic model, in connection with the supply chain game, provides an informative basis for the future development of incentives by which supply chains can be aligned in order to reduce supply chain risks.

The oil and gas production in Norway is a challenging area for applying SCM to solve complex problems. Since 2003, oil and gas (O&G) production business on the Norwegian Continental Shelf entered a new development path, which is described in **Chapter XIV**. Smart integrated IT-based operation is seen as the way forward. It is intended to re-engineer the industry structure within the next few years with new policies and practices establishing operational networks and collaborative partnerships between O&G producers, and the service-support-supply market through active integration for effective and efficient management of offshore production assets. Adaptation of this approach is largely stimulated by rapid development in application technology, large-scale information and communication platforms, and the foreseen substantial commercial benefits of well-integrated collaborative industry infrastructure. This is a novel macro-scale program and the Norwegian O&G industry has already launched major initiatives in this regard to realize its fully functional status by the year 2010. The sophisticated information and communication platform and onshore support centres represent major Norwegian initiatives in this digital era.