

MARTIN CHRISTOPHER

# Logistics & Supply Chain Management

Fourth Edition

**Financial Times  
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In addition to working with many companies in an advisory capacity he is also a Visiting Professor at universities in the UK, Australia, Spain and Sweden.

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# Preface

When the first edition of this book was published in 1992, supply chain management as an idea was still in its infancy and relatively few companies had made it a priority.

The same was true for logistics management, although its precursor, distribution management, was increasingly being recognised as important both in terms of cost and for its potential impact on sales.

In the intervening years from the first to the fourth edition, many things have happened. Firstly, there is now a much greater understanding of the role that supply chain management plays in creating competitive advantage. Whereas previously the focus was primarily tactical with a concern for optimising costs, now there is much more of a strategic focus with the emphasis on value creation and delivery. The second major change is the recognition that supply chain management is not just an extension of logistics management, but rather that it is about managing *relationships* across the complex networks that today's supply chains have become. A third significant change over that period is that the business environment has become a lot more volatile and hence less predictable. This transition from a relatively stable world to one that is much more turbulent requires supply chains to be capable of changing rapidly to meet changed circumstances.

These changes are reflected in the additional material included in this new edition. Thus complexity management and the challenge of making the transition from a forecast-driven to a demand-driven business model are given greater emphasis.

As ever, I have been greatly influenced in my thinking by the ideas and contributions of colleagues. I have had the privilege over the years to work with many academics and practitioners around the world who have provided me with inspiration as well as feedback on my ideas on how modern supply chains should be designed and managed. Long-standing collaborators include Alan Braithwaite, Chairman of LCP Consulting, Professor John Gattorna of Macquarie University, Australia, Professor Douglas Lambert of Ohio State University, USA and Professor Denis Towill of Cardiff University, UK.

More recently I have benefited greatly from sharing ideas with Dr Omera Khan of Manchester University, UK, Dr Matthias Holweg of Cambridge University, UK and Dr Janet Godsell and Dr Uta Jüttner, both colleagues at Cranfield University. I thank them all.

Finally I want to thank Tracy Stickells who has skilfully managed the production of the manuscript for this book – a complex logistics process in itself.

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## Tables

Table on page 74 from 'The Customer Profit Centre', *Focus*, 2 (2) (Hill, G.V. and Harland, D.V. 1983), Institute of Logistics and Distribution Management; Table 10.1 from *Supply Chains in a Vulnerable, Volatile World*, A.T. Kearney (2003)

## Text

Quote on page 136 from *The Scotsman*, 14/02/2007; Extract on page 160 from *The Times*, 21/04/2010; Extract on page 186 from *Disenchanted companies begin moving production back to UK*, *The Times*, 30/12/2009; Article on page 195 from *Supply Chains in a Vulnerable, Volatile World* (A.T. Kearney 2003); Article on page 244 from *12,000-mile round trip to have seafood shelled*, *Daily Telegraph*, 16/11/2006, © Telegraph Media Group Limited 2006; Extract on page 244 from *Mastering Carbon Management: Balancing Trade-Offs to Optimise Supply Chain Efficiencies*, IBM Global Services (Butner, K., Geuder, D. and Hittner, J. 2008), Reprint courtesy of International Business Machines Corporation, © 2008 International Business Machines Corporation; Extract on page 252 from *Supply Management*, 15 February 2007, [www.supplymanagement.com](http://www.supplymanagement.com); Extract on page 254 from 'Intelligent Transport Systems', *Postnote*, January, No. 322 (UK Parliamentary Office of Science and

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