

The Theory, Methods and Application of Managing Digital Supply Chains

Sustainability is one of the most pressing issues today, and this book brilliantly explores how digital supply chain management (DSCM) can be harnessed to address the sustainability challenges. The authors have carefully integrated sustainability considerations throughout the book, culminating in Chapter 9's in-depth examination of sustainability challenges in the digital supply chain. I find this approach particularly commendable. It underscores the critical role that DSCM plays in creating more environmentally and socially responsible supply chains. The holistic perspective presented in this book is a testament to the authors' expertise and dedication to advancing the field.

—*Dr Shakeel Sadiq Jajja*,
Fulbright Fellow, Stanford University, SA
Associate Professor of Operations and Supply Chain management
LUMS University, Pakistan

While working on the various industry-driven projects, I have witnessed firsthand the challenges and opportunities presented by the integration of digital technologies into supply chain operations. This book provides a comprehensive and well-researched guide to understanding and navigating this transformation. The expertise and dedication of authors to advancing the field shine through in this work, making it an invaluable reference for senior executives and decision-makers looking to drive innovation and efficiency within their organizations.

—*Ishizaka Aessio*
Distinguishe Professor of Decision Analysis
NEOMA Business School, France

This book is a significant contribution to the field and a vital resource for professionals seeking to navigate the digital transformation of supply chains. I particularly appreciate the book's exploration of disruptive digital technologies and their real-world applications, as well as its discussions on Industry 4.0 technologies.

—*Dr Charbel Jose Chiapetta Jabbour*
Professor of Green, Circular, and Responsible Supply Chains
NEOMA Business School, France

The Theory, Methods and Application of Managing Digital Supply Chains

BY

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INVESTOR IN PEOPLE

To my parents, wife, children, and friends.

—Muhammad Shujaat Mubarik

To my late parents, family, and friend.

—Sharfuddin Khan

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About the Authors

Dr Muhammad Shujaat Mubarik is currently serving as an Associate Professor of Logistics and Supply Chain Management at the Edinburgh Business School, Heriot-Watt University, UK. He has also been a Visiting Professor at Copenhagen Business School, Denmark. His academic journey has been marked by a wealth of experience, including his prior role as the Professor and Dean of the College of Business Management (CBM) at the Institute of Business Management (IoBM) in Karachi. Dr Mubarik's research interests are diverse, encompassing the behavioural and technological dimensions of supply chains, with a particular emphasis on the critical aspects of intellectual capital and sustainability within firms. He has made significant contributions to the field of supply chain management, focusing on the role of supply chain mapping and digital twin technologies in enhancing the triple bottom lines of supply chains. His scholarly work has been published in esteemed journals such as the *Supply Chain Management: An International Journal*, *International Journal of Production Research*, *Technological Forecasting and Social Change*, *Business Strategy and Environment*, *Journal of Cleaner Production*, *Journal of Intellectual Capital*, and *Management Decision*. Notably, he has authored two books titled *Supply Chain Mapping, Sustainability and Industry 4.0* and *Human Capital, Innovation and Disruptive Digital Technology*, both published by Routledge. He has also been PI and CO-PI of projects funded by various agencies. Currently, Dr Mubarik is engaged in a funded project that explores the implementation of blockchain-driven supply chains in the Oil and Gas sector. Beyond academia, he is a sought-after expert in the media, frequently appearing on television shows to share his expert opinions on national and international economics and business affairs.

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Technological Forecasting and Social Change, Production Planning and Control, Expert Systems with Application, Journal of the Operational Research Society, Annals of Operations Research, International Journal of Information Technology & Decision Making, Corporate Social Responsibility and Environmental Management, Knowledge-Based Systems, etc. He also attended several international conferences such as POMS, IEEE-IEEM, IEOM, GOL, etc. Sharfuddin has also guest edited special issues of prestigious international journals in the areas of Supply Chain Management and Decision Making.

Foreword

I am honored to provide this foreword for the book in hand titled: *The Theory, Methods and Application of Managing Digital Supply Chains*. I have been witnessing the profound changes brought about by the relentless march of digital technologies. In a world marked by its complexity and unpredictability, supply chain management has assumed an ever greater significance for organizations of all sizes and industries. The traditional paradigms that once governed the field have been thoroughly disrupted by the advent of digital technologies. Consequently, understanding and effectively leveraging digital supply chain management (DSCM) has become an imperative for organizations striving to thrive in today's landscape.

This book, *authored by two distinguished scholars: Dr Shujaat Mubarik and Dr Sharfuddin*, offers an expansive and insightful examination of DSCM from various angles. It guides readers through the evolution of DSCM, providing valuable historical context that aids in comprehending the present and anticipating what lies ahead. The book covers a diverse array of topics, from the transformative influence of digital technologies to the sustainability challenges confronting organizations in the digital era. One standout aspect of this book is its multifaceted approach. It not only addresses the "What" and "How" of DSCM but also delves into the "Why." For instance, the economic perspective presented in the book sheds light on the motivations and incentives driving the adoption of digital supply chain solutions. Additionally, the exploration of intellectual capital underscores the vital role of intangible assets in achieving excellence in DSCM.

From the perspective of someone deeply engaged in industry practices, I particularly appreciate the practical relevance of the content of the book. It offers actionable insights that organizations can immediately apply to enhance their supply chain operations in our increasingly digital and interconnected world. The discussions on Industry 4.0 technologies and the economic perspective of DSCM are particularly noteworthy in this regard.

In a nutshell, *The Theory, Methods and Application of Managing Digital Supply Chains* is a timely and indispensable resource for anyone interested in the field of supply chain management. It not only captures the current state of DSCM but also provides a forward-looking perspective on the future of supply chain management in the digital age. I commend the authors for their dedication and

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expertise in creating this exceptional contribution to the field. I have no doubt that this book will serve as a guiding light for researchers, practitioners, and students navigating the intricate and dynamic world of DSCM.

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Preface

In today's hyperdynamic and highly intertwined digital world, the field of supply chain management has undergone a profound transformation. The emergence of disruptive digital technologies, the global challenges brought about by the COVID-19 pandemic, and the relentless pursuit of sustainability have all converged to shape the landscape of modern supply chains. In this vein, the book in hand is an effort to explore the multifaceted realm of digital supply chain management (DSCM) with the aim of providing a comprehensive and insightful exploration of its evolution, definitions, dimensions, and applications.

The journey into the world of DSCM begins in Chapter 1, where we set the stage by tracing the evolution of supply chain management in the digital age. We explore the various definitions and dimensions of DSCM, laying the foundation for a deeper understanding of the subject. In Chapter 2, we take a closer look at disruptive digital technologies and their impact on contemporary supply chains. The rapid advancements in technologies such as AI, blockchain, and the IoTs are reshaping the way businesses operate and manage their supply chains. We discuss how these technologies are changing the game and explore their practical implications. Chapter 3 shifts the focus to a post-COVID-19 perspective. The pandemic has posed unprecedented challenges to supply chains worldwide, forcing organizations to rethink their strategies and adapt to a new reality. We examine the lessons learned from the pandemic and how they have influenced the trajectory of DSCM. Moving beyond the immediate challenges, Chapter 4 provides an economic perspective on the adoption of DSCM. We explore the economic rationale behind investing in digital supply chain capabilities and discuss the potential benefits and risks involved. Closely connected to this intellectual capital – *comprising human, relational, and structural capital of a firm* – and its role in DSCM is discussed. Particularly, this chapter explores the association between an intellectual capital of a firm and its ability to excel in DSCM. Chapter 6 is yet another closely knitted chapter, where we delve into the association between DSCM and organizational performance. We examine how effective DSCM practices can impact various facets of an organization, from efficiency and cost-effectiveness to customer satisfaction and competitiveness.

Further, we explore the challenges and opportunities organizations face in their journey toward digitalization and provide insights into successful implementation. In this vein, Chapter 7 investigates the strategies and approaches for adopting digital supply chain transformation. Chapter 8 takes a deep dive into the synergy between DSCM and Industry 4.0 technologies. Industry 4.0, characterized by automation, data exchange, and smart manufacturing, is reshaping industries, and we examine

how it aligns with digital supply chains. Sustainability is a pressing concern in modern supply chain management, and Chapter 9 explores the sustainability challenges associated with DSCM. We delve into the environmental, social, and ethical aspects of digital supply chains. In the last two chapters, we gaze into the crystal ball to envision the future of DSCM. We explore emerging trends, potential disruptions, and the evolving role of DSCM in the ever-changing business landscape.

This book is the culmination of extensive research, diverse perspectives, and practical insights gathered from experts in the field of supply chain management and digital technologies. It is our hope that this multidimensional perspective on DSCM will serve as a valuable resource for academics, practitioners, and students alike. Whether you are seeking to understand the foundations of digital supply chains or envision their future, this book aims to provide a holistic and informed view of this dynamic field.

As we embark on this journey through the theory, methods, and applications of managing digital supply chains, we invite you to explore the rich tapestry of insights and knowledge that awaits within these pages. The world of supply chain management is evolving, and DSCM is at the forefront of this transformation. We hope this book will empower you to navigate the digital frontier of supply chains with confidence and expertise.

*Muhamad Shujaat Mubarik
Sharfuddin Ahmed Khan*

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