Preface

The development of this edited book is inspired by the organization of the 9th International Conference on Operations and Supply Chain Management, which was held in July 2015 and was hosted by the University of Nottingham Ningbo China. The theme of the conference is “Data-Driven Research for Supply Chain Management”. The lead editor of this book is the conference co-chair, and the other editors are the organizing committee members. It is found that from the panel discussions, presentations, and paper submissions from the conference applications of big data to operations or supply chain management are premature. There is a need to consolidate recent works and to construct a clearer roadmap for future research in this area.

Data-driven research is a new research paradigm which may bring in a new discipline for supply chain management, which has witnessed the prime value of information systems and information sharing in the last few decades. With that background, information sharing will introduce a huge amount of data and its intelligence can be very useful to firms competing in the digital economy or big data era. This line of thought can also blend with supply chain service innovation. Despite promised benefits, however, the area is under-researched.

One significant driver to the data-driven research is the pace of technological development in the last two decades. Computational power has improved drastically, data collection has never been easier, and data storage seems to have reached a stage of unlimited capacity. Mobile devices such as smart phones, Internet-of-Things are ubiquitously available for data generation and collection. Consequently, a massive amount of data is available, and can be stored in various professional cloud services, for example. Obviously, these data contain fruitful information. Despite this, converting these valuable data into information remains a challenge. The main obstacle is the unorganized nature of the data. It is not surprising that such research arena remains superficial and stays at a high level. In this connection, new business models and practices are required to fully utilize the data, which in turn can create lots of opportunities for data-driven research in the operations and supply chain management domain to improve excellence.
In fact, this recent trend can be considered as an extension of traditional supply chain innovation and management, which require interdisciplinary methodologies from multiple fields including supply chain management, information systems, knowledge management, etc. This edited book provides a collection of recent and original contributions covering a variety of aspects of innovation and operations in supply chain management and decision sciences in the big data era. Not only theoretical research studies are featured in this book, but a number of practical articles are selected. This is definitely a source of good practical reference.

The book is organized into four sections: Insights from the Academia and Practitioners (Section 1), Big Data on Operations and Supply Chains (Section 2), Big Data and Emerging Technology (Section 3), and Social Media Data Research (Section 4). Section 1 contains two chapters which are the summaries of two panel discussions at the 9th International Conference on Operations and Supply Chain Management. Not only academics’ views are included, but the practitioners’ views on big data are discussed. Section 2 consists of four chapters that outline the impact of big data on various operations management or supply chain management issues (for example, inventory management, preventive maintenance, transportation). Section 3 reveals the relationships between big data and some emerging technologies on supply chain management. As mentioned before, technological development is a catalyst to big data research and hence it is worth studying such relationships. Three types of technologies are discussed in three chapters under this section. Finally, Section 4 presents three studies utilizing social media data to facilitate a couple of supply chain activities. Social media data are user-generated and hence a good use of them will improve customer service. The set of data is also a significant source of big data. That being said, their unstructured and qualitative characteristics are different to manipulated. Details of the chapters are summarized below.

Chapter 1, “Big Data Analytics: Academic Perspectives,” provides a summary of the challenges, opportunities, and emerging research approaches on big data research in operations and supply chain management from the academics’ point of view. Examples on data mining, data visualization, etc., are given. This chapter is a reflection of an academic panel discussion at the 9th International Conference on Operations and Supply Chain Management.

Chapter 2, “Big Data Analytics: Service and Manufacturing Industries Perspectives,” is a sister chapter of Chapter 1. Likewise, the chapter originates from a panel discussion at the 9th International Conference on Operations and Supply Chain Management, but this panel consists of a number of industrial practitioners, who are senior management people in different types and scales of companies. Their discussion provides insights on practical issues and implementation challenges from the industry perspective.
Chapter 3, “How Smart Operations Help Better Planning and Replenishment: Empirical Study – Supply Chain Collaboration for Smart Operations,” starts discussing how various data can influence smart operations. Several case studies in different industries, including frozen food, textile, petroleum, packaging, and electrical equipment manufacturer, are employed to illustrate the idea. Such smart operations are particularly useful to resource planning, supplier management, and so on.

Chapter 4, “Big Data Analytics for Predictive Maintenance Strategies,” discusses how big data can facilitate predictive maintenance. Obviously predictive maintenance is an important industrial operation, which aims to reduce the risk of disruption. Consequently, supply chain activities can be carried out smoothly. Traditional approaches based heavily on statistical methods and historical data. This study utilizes big data to perform predictive maintenance in a semiconductor manufacturing environment. Fuzzy logic and artificial neural network are incorporated in the decision support system in order to extract and analyse the data. The case example provides excellent practical value to the readers.

Chapter 5, “Data-Driven Inventory Management in the Healthcare Supply Chain,” employs big data techniques to improve inventory management in the healthcare supply chain. More specifically, classification and regression tree algorithm is employed to predict sales data from historical data. Data from a real-life example are used to verify that the algorithm outperforms standard static statistical methods. Again, the practical value of this chapter is equally important to the one presented in Chapter 4.

Chapter 6, “Role of Operations Strategy and Big Data: A Study of Transport Company,” turns the discussion to another type of important supply chain operations, namely, transportation. This study aims to reveal how big data collected by Internet-of-Things can improve less than truck load operations. Traditionally, such operations are not always cost efficient and hence profit margin sometimes is low.

Chapter 7, “Big Data and RFID in Supply Chain and Logistics Management: A Review of the Literature and Applications for Data-Driven Research,” supplements the discussion in Chapter 6 by providing a fabulous literature review in the same area. Nevertheless, the focus is not just put on less than truck load operations, but general supply chain and logistics operations. The authors suggest a number of research directions that are valuable to the researchers in this field.

Chapter 8, “Developing an Integration Framework for Crowdsourcing and Internet of Things with Applications for Disaster Response,” develops a framework to bridge crowdsourcing operations and Internet-of-Things, with an application on disaster response. It is well-known that disaster is difficult to detect; so if it happens one important issue is the reaction. With the Internet-of-Things technology, information can be conveyed even under such circumstances. Qualitative interviews were conducted to support the proposed framework.
Chapter 9, “Supply Chain Coordination Based on Web Services,” proposes a semantic web services, which encompasses knowledge-based system to facilitate supply chain integration and coordination. More specifically, different business scenarios are modelled using case-based reasoning system. Detailed descriptions of the system are presented in the chapter.

Chapter 10, “Exploring the Hidden Pattern from Tweets: Investigation into the Volkswagen Emissions Scandal,” explores how social media data, more specifically tweets in this study, can reveal the hidden information about the famous diesel-gate incident. A mixed text-mining method provides a sentiment on the users’ reaction to the incident. The results provide insights on how to manage and design supply chain network with respect to the incident.

Chapter 11, “Swift Guanix Data Analysis and Its Application to E-Commerce Retail Strategies Improvement,” extracts a different type of online data, e-commerce social media data based on the communications between a fashion retailer and its consumers. The objective of the study is to apply content analysis to study whether or not swift guanix generated from such communications can improve trust for online purchasing. This study contributes to the development of e-commerce strategy.

Chapter 12, “Applying Big Data with Fuzzy DEMATEL to Discover the Critical Factors for Employee Engagement in Developing Sustainability for the Hospitality Industry: Multi-Criteria Decision Making/Group Decision Making,” applies big data for making decisions, an important area of operations and supply chain management. With the help of big data, relative importance between different selection criteria can be obtained without human judgement. Therefore, the decision is more objective.

The editors believe that the collection of chapters is relevant and beneficial to the needs of professionals, researchers, post-doctoral and graduate students working in the field of supply chain management in various functions such as purchasing, logistics, operations, and supply chain strategy, whose research interests are in big data or data-driven research.

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