

Preface

In today's global economies, logistics has been recognized as one of the key factors that determine the competitive position of both individual corporations and industry-based networks. At the same time, the very nature of supply chains and supply networks is changing rapidly, as a result of both technological and social developments. These developments include advances in ICT and industrial automation (sensors, robotics, 3D printing, and smart mobility) but also environmental concerns (scarcity of natural resources, carbon emission, and congestion) and finally new business models (e.g., e-commerce). The incorporation of these new technologies' potential in modern supply chain operations, while at the same time addressing environmental and societal concerns, is a formidable challenge for companies, economic clusters, and nations. But a challenge that has to be met: The importance of logistics as an indispensable factor of economic development is undisputed, as evidenced also by the annual publication of the World Bank Logistics Performance Index.

Innovation in logistics and supply chain management is a key to respond to the challenges outlined above. Such innovation requires intensive collaboration of industry and research and education institutes, to translate technological developments into sound business models and to train tomorrow's logistic engineer. For Germany and the Netherlands, the two focal innovation clusters are the Dinalog cluster and the EffizienzCluster LogistikRuhr. The editors of this book have ample experience in conducting projects that aim at the implementation of concepts and ideas in the day-to-day business environment (practicality gap). They also concluded there is a strong need in industry to understand the fundamentals of topics such as sustainable logistics, ICT integration, and Web-based businesses (theory gap).

From these experiences, the basic idea for this edited volume was born: to present state-of-the-art advances in logistics theory in different fields as well as to provide case studies for successful and promising logistics applications within important innovation areas in modern logistics management as best practice. This book reports on a number of studies carried out (and still ongoing) in the Dinalog cluster and the EffizienzCluster LogistikRuhr, bringing together different

perspectives of basic and applied research. Above all, it should serve to inform the broader logistics and supply chain sector on what can be achieved by implementing novel and smart innovative ideas and what is needed to make these implementations successful.

In order to support this approach of bridging theory and practice in modern logistics, a selected portfolio of theory outlines, practical examples and case studies and in particular project reports or knowledge management documentations within different areas of logistics and supply chain planning is presented in this volume. The editors have selected contributions from a wide variety of projects carried out in the Dinalog cluster and the Effizienzcluster LogistikRuhr. Contributions are grouped into five main parts, each representing key domains in the evolution of logistics and supply chain management:

- (A) Logistics innovation and sustainability;
- (B) Urban logistics;
- (C) Value chain management;
- (D) IT-based innovation; and
- (E) Logistics training and knowledge management.

Within each part, important topics are outlined and demonstrated through their application in a variety of case studies. This book is intended for both researchers and practitioners in the field of logistics and supply chain management, to serve as an important source of information for further research as well as implementation in practice and hence to stimulate further innovation.

The five parts are preceded by an introductory chapter by Henk Zijm and Matthias Klumpp. After a brief historical overview and a discussion of the need to design more sustainable supply chains, they list chances and opportunities and also discuss an approach advocated by the European Technology Platform for Logistics ALICE. The paper is completed with a discussion on training and competence management in logistics, including a preview on what may be expected.

Subsequently, Part I outlines *basic concepts and strategies* for sustainable and green logistics based on research and the implementation of new developments. Martijn Mes and Maria Iacob outline an approach of synchromodal transport planning in order to optimize transportation in light of greening the supply chain ([“Synchromodal Transport Planning at a Logistics Service Provider”](#)). In [“DAVIN³I: Towards Collaborative Responsive Logistics Networks in Floriculture”](#), Jack van der Vorst, Robert Ossevoort, Marlies de Keizer, Tom van Woensel, Cor Verdouw, Edwin Wenink, Rob Koppes, and Robbert van Willegen describe research the results of a large research project on the development of a collaborative logistics network in the floriculture industry as a very high-value as well as high-quality example in terms of innovative logistics. In a larger perspective, sustainable multimodal hinterland networks, including the concept of extended gates, are discussed as a major approach toward green and cost-effective logistics by Albert Veenstra and Rob Zuidwijk ([“Towards Efficient Multimodal Hinterland Networks”](#)). Thomas Kjaergaard, Martin Schleper, and Christoph Schmidt suggest in [“Current Deficiencies and Paths for Future Improvement in Corporate](#)

Sustainability Reporting” that corporate sustainability reporting should be in the center of attention and management action in order to really achieve sustainable logistics. In an operational perspective, Simon Thunnissen, Luke van de Bunt, and Iris Vis are outlining the logistics impediments and chances of the use of LNG as a fuel for both the transport and maritime sector (“**Sustainable Fuels for the Transport and Maritime Sector: A Blueprint of the LNG Distribution Network**”). The final contribution in Part I comes from Raphael Heereman von Zuydtwyck and Holger Beckmann in “**Efficiency Optimization for Cold Store Warehouses Through an Electronic Cooperation Platform**”, in which they discuss a specialized but promising approach regarding the use of online cooperation in cold store warehousing in order to reduce the environmental impact of this important section of transportation.

Parts II and III outline different levels of the logistics chain and optimization perspective. Whereas Part II deals with the local level in *urban logistics* concepts, Part III addresses the global level of *value chain design* and optimization. In Part II, challenges, failures, and successes of urban freight transportation are discussed by Goos Kant, Hans Quak, René Peeters, and Tom Van Woensel (“**Urban Freight Transportation: Challenges, Failures and Successes**”). In “**The Role of Fairness in Governing Supply Chain Collaborations—A Case-Study in the Dutch Floriculture Industry**”, Robbert Janssen, Ard-Pieter de Man, and Hans Quak provide an insight into the impact of fairness considerations on local transport regimes in the floriculture industry. A further important aspect of urban logistics is last-mile parcel distribution, increasing steadily with e-commerce—and therefore the contribution of Theodoros Athanassopoulos, Kerstin Dobers, and Uwe Clausen is a welcome contribution that suggests options to reduce its environmental impact (“**Reducing the Environmental Impact of Urban Parcel Distribution**”). In “**Order Fulfillment and Logistics Considerations for Multichannel Retailers**” of this part, Kees Jan Roodbergen and Inger Kolman present a framework for decision making on order fulfillment and logistics in multichannel retail distribution.

In Part III, attention is paid to maintenance and service logistics. Maarten Driessen, Jan Willem Rustenburg, Geert-Jan van Houtum, and Vincent Wiers develop control structures for integrating decision making on inventory control and repair shop control for rotatable spare parts (“**Connecting Inventory and Repair Shop Control for Repairable Items**”). In “**Knowledge Lost in Data: Organizational Impediments to Condition-Based Maintenance in the Process Industry**”, Ronald van de Kerkhof, Henk Akkermans, and Nils Noorderhaven present a pilot study on the introduction of condition-based maintenance in the process industry, as a tool to increase asset availability. Jan Willem Rustenburg discusses the merits of a control tower approach for spare parts management as a radical new business model in “**Planning Services: A Control Tower Solution for Managing Spare Parts**”. Finally, in “**Impediments to the Adoption of Reverse Factoring for Logistics Service Providers**”, Christiaan de Goeij, Alexander Onstein, and Michiel Steeman focus on the adoption of supply chain finance methods, in particular reverse factoring, by suppliers in the logistics service businesses, as a tool to enhance chain liquidity.

Part IV is dedicated to the *information technology* enhancements driving many innovations in logistics and supply chain management. In “**Towards an Approach**

for Long Term AIS-Based Prediction of Vessel Arrival Times”, Alexander Dobrkovic, Maria Iacob, Jos van Hillegersberg, Martijn Mes, and Maurice Glandrup address how automatic information system data can be used to accurately predict vessel arrival times and thereby optimize logistics. More generally, the use of information technology as a tool for supply chain design, integrating various formerly isolated modules, is discussed and illustrated with case examples by Matthias Parlings, Tobias Hegmanns, Philipp Sprenger, and Daniel Kossmann in “Modular IT-Support for Integrated Supply Chain Design”. Even more into current information technology research is the use of multi-agent systems, i.e., in transport coordination as presented by Frank Arendt, Oliver Klein, and Kai Barwig (“Intelligent Control of Freight Services on the Basis of Autonomous Multi-agent Transport Coordination”). Also the supply chain-wide implementation of RFID is still on the table for logistics innovation and value optimization as Kerem Oflazgil, Christian Hocken, Fabian Schenk, Oliver Teschl, Thorsten Lehr, Mareike de Boer, Christoph Schröder, and Rainer Alt outline in “Smart.NRW—RFID as Enabler for an Intelligent FMCG Supply Chain”. The need to improve compliance to external regulations (e.g., customs) in supply chains, without delaying the flow more than necessary, presents a further challenge to smart information system design as Melissa Robles, Juan Diego Serrano, Maria Laura Maragunic, and Bernd Noche argue in “Developing Support Tools for Compliance in Supply Chains”. A logistic assistance system to support quality control and quality management for logistic processes is presented by Markus Zajac and Christian Schwede (“Cross-Process Production Control by Camera-Based Quality Management Inside a Logistic Assistance System”). The last contribution of Part IV, “Logistics Mall—A Cloud Platform for Logistics” by Damian Daniluk, Maren Wolf, Oliver Wolf, and Michael ten Hompel, discusses the logistics mall, an approach for a domain-specific cloud platform for the trading and usage of logistics IT services and logistics processes.

Last but not least, the final Part V highlights the importance of *competencies and knowledge management for logistics* in bringing most innovation and technology approaches to full fruit. Therein, an approach for problem-oriented knowledge management in logistics is discussed by Natalia Straub, Christoph Besenfelder, and Sandra Kaczmarek (“Problem-Oriented Knowledge Management for Efficient Logistics Processes”). In “Logistics Qualification: Best-Practice for a Knowledge-Intensive Service Industry”, Matthias Klumpp is providing an overview regarding measurement concepts as well as political initiatives directed toward best-practice approaches in logistics training and education. Finally, in “Serious Games for Improving Situational Awareness in Container Terminals”, Alexander Verbraeck, Shalini Kurapati, and Heide Lukosch discuss the concept of situational awareness at container terminals as a basis for online (re)planning; they have developed various serious gaming-based instruments that have proven their value in the training of both students and practitioners in industry.

We would like to stress that many contributions include pilot or case studies at a large spectrum of industrial companies, which therefore essentially contribute to the objective of this volume: to bridge the gap between theory and practice in logistics and supply chain management. At this place, we extend our appreciation to their

willingness to share current processes and data and to jointly work with academic partners toward improving business processes. But most of all, we are grateful to all the authors for their highly valued contributions; working with them was a rewarding experience. Finally, we express the hope that the projects discussed in this book may be of interest to practitioners in industry as well as to industrial engineering and logistics students, and that they may serve as a source of inspiration for further research. We look forward to the further application and implementation of the innovative concepts presented in this volume in industry.

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