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Call for Chapters in the book

Supply Network Dynamics and Control

Editors
Prof. Alexandre Dolgui
Automation, Production and Computer Sciences Dept.
IMT Atlantique LS2N - CNRS UMR 6004 La Chantrerie
E-Mail: alexandre.dolgui@imt-atlantique.fr
Web: http://www.emse.fr/~dolgui/
Prof. Dmitry Ivanov
Professor of Supply Chain and Operations Management
Berlin School of Economics and Law
Badensche Str. 50, 10825 Berlin, Germany
E-Mail: divanov@hwr-berlin.de
Web: blog.hwr-berlin.de/ivanov
Prof. Boris Sokolov
Laboratory for Information Technologies in Systems Analysis and Modeling
St. Petersburg Institute of Informatics and Automation of the RAS (SPIIRAS)
E-Mail: sokol@iias.spb.su
Web: http://litsam.ru/index.php/en/staff-en/boris-v-sokolov

Scope of Area to be Covered:

Supply chain networks undergo transformations on the scale unlike any seen before. Extensive technology adoptions in supply chain networks render changes in network structures entailing multi-structural dynamics (i.e., new technologies such as Industry 4.0 and additive manufacturing lead to creating more dynamic and *reconfigurable* supply chains). Technologies also allow for better observing and controlling supply chain dynamics (e.g., through visibility and real-time data analytics). On the other hand, the COVID-19 pandemic has strengthened the disruption-related questions of supply chain network dynamics and clearly showed the key role of dynamics control, adaptability and *viability* in supply chain networks both at the strategic and operational levels.
Overall, modern and future supply chain networks are increasingly challenged by uncertainty and risks, multiple feedback cycles, adaptive mechanisms, and dynamics. Supply network control is multi-faceted area and can be seen in many ways such as structural dynamics, feedback mechanisms, adaptation loops, multi-period control of material flows, and operational dynamics (i.e., inventory dynamics). Supply network dynamics has been studied by various methodologies such as optimal con-

trol, model-predictive control adaptive control, feedback control, ecological modelling, chaos theory, complex adaptive systems, differential dynamic games, systems dynamics, complex adaptive system to name just a few.

Empirical problem settings, modelling approaches, mathematical techniques differ across these methodologies but most of them share a common set of attributes: system evolution over time, dynamic changes in the system, and changes in system behaviors through interactions with the environment. As such, different control and dynamical system theories have commonalities in taking into account the dynamics, non-linearity, and non-stationary of supply network processes.

This book offers an introduction and advanced techniques to supply network dynamics with applications to manufacturing, service, supply chain, and Industry 4.0 systems for larger audience. In particular, the methods of optimal control, model-predictive control adaptive control, feedback control, ecological modelling, chaos theory, complex adaptive systems, network and complexity theory, differential dynamic games, systems dynamics (but not limited to) are in the scope of this book. We also encourage empirical research chapters which theorize supply network dynamics and control paradigms.

The Purpose of the Book, the Needs it will Address, and any Distinctive or Innovative Treatments

The Book is intended to be designed at three levels:

- SC network dynamics analysis (e.g., structural dynamics)
- SC design and planning dynamics (e.g., material flow reconfiguration)
- SC operational dynamics (e.g., inventory dynamics)

The variety of quantitative analysis methodologies, optimization, simulation, optimal control, model-predictive control adaptive control, feedback control, ecological modelling, chaos theory, complex adaptive systems, differential dynamic games, systems dynamics, Bayesian networks, and analytics-driven approaches are welcome. We also encourage empirical research chapters which theorize supply network dynamics and control paradigms.

The purpose of this book is to comprehensively present recent developments in supply network dynamics research and to systemize these developments in new taxonomies and methodological principles. This book addresses the needs of both researchers and practitioners to uncover the challenges and opportunities of supply chain and operations management by dynamic system analysis. We aim to present research done with the help of different methodologies to show the commonalities, differences, and application areas of different methods to study supply network dynamics. We aim at providing both a state-of-the-art progress and are looking at new topics for supply network dynamics such as *Industry 4.0, Viable Supply Chain, Reconfigurable Supply Chain, digital twins, sustainability, cloud manufacturing, ripple effect and resilience*, to name a few. For the first time, we intend to develop a book that collates recent research on control and dynamical system applications to supply chain and operations management. Those application areas include but are not limited to scheduling, production and inventory control, stability and resilience analysis. Control and dynamical systems allow addressing conveniently some fundamental properties of supply chains, manufacturing and logistics systems such as non-linearities, information feedbacks, time-related issues, and adaptation which might be difficult to model in other methods.

Distinctive Features:

- It uncovers fundamental principles and recent developments in control and dynamical system theories with applications to supply chains, manufacturing and logistics systems

- Bridging the fundamentals of control and dynamical system theories to supply chain and operations management
- Systemizing new developments and deciphering taxonomies and methodological principles to shape the research domain of supply network dynamics control
- Innovative applications of uncertainty modellings in supply chains, manufacturing and logistics systems
- Unique multi-disciplinary view with utilization of control engineering, operations research, industrial engineering and computer science techniques

The Intended Audience:

Graduate and PhD students in industrial engineering, operations research and management science, production engineers, supply chain and operations management professionals, operations and supply chain researchers.

Chapter Submission

We encourage different types of chapters: vision chapters, theory-building chapters, and chapters drawing on research results (e.g., models). The book will consist of about 20 chapters. The length of each Chapter should be about 15-25 pages (approximately 8,000-15,000 words, including references and all figures and tables). Springer template can be used for Chapter preparations, including Springer reference style: https://www.springer.com/gp/authors-editors/book-authors-editors/manuscript-preparation/5636. All the permissions should be obtained by the authors prior to the Chapter submission. All the chapters will be reviewed by editors. We kindly ask the authors for a thorough proof-reading prior to submission. The final proof-reading and copy-editing will be done by Springer. Once we submit the manuscript files, they will proofread and copyedit the chapters, and then route the pages proofs to your authors for final corrections and confirmation.

Submission Deadline: June 30, 2021. Chapters should be submitted to Managing Editor:
Prof. Dr. Dmitry Ivanov; E-Mail: divanov(at)hwr-berlin.de

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