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IFIP was founded in 1960 under the auspices of UNESCO, following the first World Computer Congress held in Paris the previous year. A federation for societies working in information processing, IFIP's aim is two-fold: to support information processing in the countries of its members and to encourage technology transfer to developing nations. As its mission statement clearly states:

> *IFIP is the global non-profit federation of societies of ICT professionals that aims at achieving a worldwide professional and socially responsible development and application of information and communication technologies.*

IFIP is a non-profit-making organization, run almost solely by 2500 volunteers. It operates through a number of technical committees and working groups, which organize events and publications. IFIP's events range from large international open conferences to working conferences and local seminars.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is generally smaller and occasionally by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is also rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

IFIP distinguishes three types of institutional membership: Country Representative Members, Members at Large, and Associate Members. The type of organization that can apply for membership is a wide variety and includes national or international societies of individual computer scientists/ICT professionals, associations or federations of such societies, government institutions/government related organizations, national or international research institutes or consortia, universities, academies of sciences, companies, national or international associations or federations of companies.

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Alexandre Dolgui · Alain Bernard ·
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Advances in Production Management Systems

Artificial Intelligence for Sustainable and Resilient Production Systems

IFIP WG 5.7 International Conference, APMS 2021
Nantes, France, September 5–9, 2021
Proceedings, Part IV

Springer

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Preface

The scientific and industrial relevance of the development of sustainable and resilient production systems lies in ensuring future-proof manufacturing and service systems, including their supply chains and logistics networks. “Sustainability” and “Resilience” are essential requirements for competitive manufacturing and service provisioning now and in the future. Industry 4.0 technologies, such as artificial intelligence; decision aid models; additive and hybrid manufacturing; augmented, virtual, and mixed reality; industrial, collaborative, mobile, and software robots; advanced simulations and digital twins; and smart sensors and intelligent industrial networks, are key enablers for building new digital and smart capabilities in emerging cyber-physical production systems in support of more efficient and effective operations planning and control. These allow manufacturers and service providers to explore more sustainable and resilient business and operating models. By making innovative use of the aforementioned technologies and their enabled capabilities, they can pursue the triple bottom line of economic, environmental, and social sustainability. Furthermore, industrial companies will be able to withstand and quickly recover from disruptions that pose threats to their operational continuity. This is in the face of disrupted, complex, turbulent, and uncertain business environments, like the one triggered by the COVID-19 pandemic, or environmental pressures calling for decoupling economic growth from resource use and emissions.

The International Conference on Advances in Production Management Systems 2021 (APMS 2021) in Nantes, France, brought together leading international experts on manufacturing, service, supply, and logistics systems from academia, industry, and government to discuss pressing issues and research opportunities mostly in smart manufacturing and cyber-physical production systems; service systems design, engineering, and management; digital lean operations management; and resilient supply chain management in the Industry 4.0 era, with particular focus on artificial intelligence-enabled solutions.

Under the influence of the COVID-19 pandemic, the event was organised as online conference sessions. A large international panel of experts (497 from 50 countries) reviewed all the submissions (with an average of 3.2 reviews per paper) and selected the best 377 papers (70% of the submitted contributions) to be included in these international conference proceedings. The topics of interest at APMS 2021 included artificial intelligence techniques, decision aid, and new and renewed paradigms for sustainable and resilient production systems at four-wall factory and value chain levels, comprising their associated models, frameworks, methods, tools, and technologies for smart and sustainable manufacturing and service systems, as well as resilient digital supply chains. As usual for the APMS conference, the Program Committee was particularly attentive to the cutting-edge problems in production management and the quality of the papers, especially with regard to the applicability of the contributions to industry and services.

The APMS 2021 conference proceedings are organized into five volumes covering a large spectre of research concerning the global topic of the conference: "Artificial Intelligence for Sustainable and Resilient Production Systems".

The conference was supported by the International Federation of Information Processing (IFIP), which is celebrating its 60th Anniversary, and was co-organized by the IFIP Working Group 5.7 on Advances in Production Management Systems, IMT Atlantique (Campus Nantes) as well as the Centrale Nantes, University of Nantes, Rennes Business School, and Audecia Business School. It was also supported by three leading journals in the discipline: Production Planning & Control (PPC), the International Journal of Production Research (IJPR), and the International Journal of Product Lifecycle Management (IJPLM).

Special attention has been given to the International Journal of Production Research on the occasion of its 60th Anniversary. Since its foundation in 1961, IJPR has become one of the flagship journals of our profession. It was the first international journal to bring together papers on all aspects of production research: product/process engineering, production system design and management, operations management, and logistics. Many exceptional scientific results have been published in the journal.

We would like to thank all contributing authors for their high-quality work and for their willingness to share their research findings with the APMS community. We are also grateful to the members of the IFIP Working Group 5.7, the Program Committee, and the Scientific Committee, along with the Special Sessions organizers for their support in the organization of the conference program. Concerning the number of papers, special thanks must be given to the local colleagues who managed the reviewing process as well as the preparation of the conference program and proceedings, particularly Hicham Haddou Benderbal and Maria-Isabel Estrepo-Ruiz from IMT Atlantique.

September 2021

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Machado Brunno Abner
Maier Janine Tatjana
Maihami Reza
Makboul Salma
Makris Sotiris
Malaguti Roney Camargo
Mandal Jasashwi
Mandel Alexander
Manier Hervé
Manier Marie-Ange
Marangé Pascale
Marchesano Maria Grazia
Marek Svenja
Marjanovic Ugljesa
Marmolejo Jose Antonio
Marques Melissa
Marrazzini Leonardo
Masone Adriano
Massonnet Guillaume
Matsuda Michiko
Maxwell Duncan William
Mazzuto Giovanni
Medić Nenad
Medini Khaled
Mehnen Jorn
Mendes dos Reis João Gilberto
Mentzas Gregoris
Metaxa Ifigeneia
Min Li Li
Minner Stefan
Mishra Ashutosh
Mitra Rony
Mizuyama Hajime
Mogale Dnyaneshwar
Mohammadi Mehrdad
Mollo Neto Mario
Montini Elias
Montoya-Torres Jairo R.
Moon Ilkyeong
Moraes Thais De Castro
Morinaga Eiji
Moser Benedikt
Moshref-Javadi Mohammad
Mourtzis Dimitris
Mundt Christopher
Muši Denis
Nääs Irenilza De Alencar
Naim Mohamed
Nakade Koichi
Nakano Masaru
Napoleone Alessia
Nayak Ashutosh
Neroni Mattia
Netland Torbjørn
Neubert Gilles
Nguyen Du Huu
Nguyen Duc-Canh
Nguyen Thi Hien
Nielsen Izabela
Nielsen Kjeld
Nishi Tatsushi

Nogueira Sara
Noh Sang Do
Nonaka Tomomi
Noran Ovidiu
Norre Sylvie
Ortmeier Frank
Ouazene Yassine
Ouzrout Yacine
Özcan Uğur
Paes Graciele Oroski
Pagnoncelli Bernardo
Panigrahi Sibarama
Panigrahi Swayam Sampurna
Papakostas Nikolaos
Papcun Peter
Pashkevich Anatol
Pattnaik Monalisha
Pels Henk Jan
Pérès François
Persson Fredrik
Pezzotta Giuditta
Phan Dinh Anh
Piétrac Laurent
Pinto Sergio Crespo Coelho da
Pirola Fabiana
Pissardini Paulo Eduardo
Polenghi Adalberto
Popolo Valentina
Portioli Staudacher Alberto
Powell Daryl
Prabhu Vittaldas
Psarommatis Foivos
Rabelo Ricardo
Rakic Slavko
Rapaccini Mario
Reis Milena Estanislau Diniz Dos
Resanovic Daniel
Rey David
Riedel Ralph
Rikalović Aleksandar
Rinaldi Marta
Roda Irene
Rodriguez Aguilar Roman
Romagnoli Giovanni
Romeo Bandinelli
Romero David
Roser Christoph
Rossit Daniel Alejandro
Rudberg Martin
Sabitov Rustem
Sachs Anna-Lena
Sahoo Rosalin
Sala Roberto
Santarek Kszysztof
Satolo Eduardo Guilherme
Satyro Walter
Savin Sergei
Schneider Daniel
Semolić Brane
Shafiq Muhammad
Sharma Rohit
Shin Jong-Ho
Shukla Mayank
Shunk Dan
Siadat Ali
Silva Cristovao
Singgih Ivan Kristianto
Singh Sube
Slama Ilhem
Smaglichenko Alexander
Smeds Riitta Johanna
Soares Paula Metzker
Softic Selver
Sokolov Boris V.
Soleilhac Gauthier
Song Byung Duk
Song Xiaoxiao
Souier Mehdi
Sørensen Daniel Grud Hellerup
Spagnol Gabriela
Srinivasan Vijay
Stavrou Vasileios P.
Steger-Jensen Kenn
Stich Volker
Stipp Marluci Andrade Conceição
Stoll Oliver
Strandhagen Jan Ola
Suh Eun Suk
Suleykin Alexander
Suzanne Elodie
Szirbik Nick B.
Taghvaeipour Afshin

Taisch Marco
Tanimizu Yoshitaka
Tanizaki Takashi
Tasić Nemanja
Tebaldi Letizia
Telles Renato
Thevenin Simon
Thoben Klaus-Dieter
Thurer Matthias
Tiedemann Fredrik
Tisi Massimo
Torres Luis Fernando
Tortorella Guilherme Luz
Troyanovsky Vladimir
Turcin Ioan
Turki Sadok
Ulrich Marco
Unip Solimar
Valdiviezo Viera Luis Enrique
Vallespir Bruno
Vasic Stana
Vaz Paulo
Vespoli Silvestro
Vicente da Silva Ivonaldo
Villeneuve Eric
Viviani Jean-Laurent
Vještica Marko
Vo Thi Le Hoa
Voisin Alexandre
von Cieminski Gregor
Von Stietencron Moritz
Wagner Sarah
Wang Congke
Wang Hongfeng
Wang Yin
Wang Yingli
Wang Yuling
Wang Zhaojie
Wang Zhixin
Wellsandt Stefan
West Shaun
Wiendahl Hans-Hermann
Wiesner Stefan Alexander
Wikner Joakim
Wiktorsson Magnus
Wimmer Manuel
Woo Young-Bin
Wortmann Andreas
Wortmann Johan Casper
Wuest Thorsten
Xu Tiantong
Yadegari Ehsan
Yalaoui Alice
Yang Danqin
Yang Guoqing
Yang Jie
Yang Zhaorui
Yelles Chaouche Abdelkrim Ramzi
Zaeh Michael Friedrich
Zaikin Oleg
Zambetti Michela
Zeba Gordana
Zhang Guoqing
Zhang Ruiyou
Zheng Feifeng
Zheng Xiaochen
Zoitl Alois
Zolotová Iveta
Zouggar Anne

Contents – Part IV

AI for Resilience in Global Supply Chain Networks in the Context of Pandemic Disruptions

Modelling COVID-19 Ripple Effect and Global Supply Chain Productivity Impacts Using a Reaction-Diffusion Time-Space SIS Model 3
Xavier Brusset, Morteza Davari, Aseem Kinra, and Davide La Torre

A Vector Logistic Dynamical Approach to Epidemic Evolution on Interacting Social-Contact and Production-Capacity Graphs 13
Jan Bart Broekaert and Davide La Torre

Modeling Shock Propagation on Supply Chain Networks: A Stochastic Logistic-Type Approach 23
Cinzia Colapinto, Davide La Torre, Iside Rita Laganà, and Danilo Liuzzi

Towards Explainable Artificial Intelligence (XAI) in Supply Chain Management: A Typology and Research Agenda 32
Godfrey Mugurusi and Pross Nagitta Oluka

Distribution of Vaccines During a Pandemic (Covid-19) 39
Vignesh Dhanapal and Subhash C. Sarin

Blockchain in the Operations and Supply Chain Management

Blockchain-Based Master Data Management in Supply Chains: A Design Science Study 51
Jacob Lohmer, Lasse Bohlen, and Rainer Lasch

Blockchain for Product Authenticity in the Cannabis Supply Chain 62
Sven Januszek, Andreas Siegrist, and Torbjørn H. Netland

A Blockchain-Based Manufacturing Service Composition Architecture for Trust Issues 70
Qianhang Lyu, Yunqing Rao, Jiawei Wang, and Peng Qi

An Approach for Creating a Blockchain Platform for Labeling and Tracing Wines and Spirits 81
Sotiris P. Gayialis, Evripidis P. Kechagias, Grigorios D. Konstantakopoulos, Georgios A. Papadopoulos, and Ilias P. Tatsiopoulos

Blockchain Design for Digital Supply Chain Integration 90
Kari Korpela, Petr Novotny, Alevtina Dubovitskay, Tomi Dahlberg, Mika Lammi, and Jukka Hallikas

Data-Based Services as Key Enablers for Smart Products, Manufacturing and Assembly

Customer Order Scheduling in an Additive Manufacturing Environment 101
Benedikt Zipfel, Janis S. Neufeld, and Udo Buscher

A Conceptual Reference Model for Smart Factory Production Data 110
Giulia Boniotti, Paola Cocca, Filippo Marciano, Alessandro Marini, Elena Stefana, and Federico Vernuccio

Generating Synthetic Training Data for Assembly Processes 119
Johannes Dümmel, Valentin Kostik, and Jan Oellerich

Data Acquisition for Energy Efficient Manufacturing: A Systematic Literature Review 129
Henry Ekwaro-Osire, Stefan Wiesner, and Klaus-Dieter Thoben

Review of Factors Influencing Product-Service System Requirements Along the Life Cycle 138
Stefan Wiesner and Jannicke Baalsrud Hauge

Data-Driven Methods for Supply Chain Optimization

Data-Driven Solutions for the Newsvendor Problem: A Systematic Literature Review 149
Thais de Castro Moraes and Xue-Ming Yuan

An Information Sharing Framework for Supply Chain Networks: What, When, and How to Share 159
Eunji Lee and Stefan Minner

A Robust Data Driven Approach to Supply Planning 169
Benoit Loger, Alexandre Dolgui, Fabien Lehuédé, and Guillaume Massonnet

Responsible Manufacturing with Information Disclosure Under Regulatory Inspections 179
Yifan Cao and Bin Shen

Understanding Supply Chain Visibility Through Experts' Perspective: A Delphi Based Approach 189
Tarun Kumar Agrawal, Ravi Kalaiarasan, Jan Olhager, and Magnus Wiktorsson

Digital Twins Based on Systems Engineering and Semantic Modeling

STARdom: An Architecture for Trusted and Secure Human-Centered Manufacturing Systems 199
Jože M. Rožanec, Patrik Zajec, Klemen Kenda, Inna Novalija, Blaž Fortuna, Dunja Mladenić, Entso Veliou, Dimitrios Papamartzivanos, Thanassis Giannetsos, Sofia Anna Menesidou, Rubén Alonso, Nino Cauli, Diego Reforgiato Recupero, Dimosthenis Kyriazis, Georgios Sofianidis, Spyros Theodoropoulos, and John Soldatos

Semantic Modeling Supports the Integration of Concept-Decision-Knowledge 208
Yili Jin, Jinzhi Lu, Guoxin Wang, Ru Wang, and Kiritsis Dimitris

Model-Based Systems Engineering Supporting Integrated Modeling and Optimization of Radar Cabin Layout 218
Shiyan She, Jinzhi Lu, Guoxin Wang, Jie Ding, and Zixiang Hu

Supporting Digital Twin Integration Using Semantic Modeling and High-Level Architecture. 228
Han Li, Jinzhi Lu, Xiaochen Zheng, Guoxin Wang, and Dimitris Kiritsis

Digital Twin-Driven Approach for Smart City Logistics: The Case of Freight Parking Management 237
Yu Liu, Pauline Folz, Shenle Pan, Fano Ramparany, Sébastien Bolle, Eric Ballot, and Thierry Coupaye

Digital Twins in Companies First Developments and Future Challenges

The Advent of the Digital Twin: A Prospective in Healthcare in the Next Decade 249
Jorge Luis Rojas-Arce and Eduardo Cassiel Ortega-Maldonado

Reviewing the Application of Data Driven Digital Twins in Manufacturing Systems: A Business and Management Perspective 256
Ehsan Badakhshan and Peter Ball

Improving a Manufacturing Process using Recursive Artificial Intelligence. . . 266
Jose Antonio Marmolejo-Saucedo, Roman Rodriguez-Aguilar, Uriel Abel Romero Perea, Manuel Garrido Vaqueiro, Regina Robredo Hernandez, Fernando Sanchez Ramirez, and Ana Paula Martinez

Digital Twin in the Agri-Food Supply Chain: A Literature Review 276
Letizia Tebaldi, Giuseppe Vignali, and Eleonora Bottani

A Digital Twin Implementation for Manufacturing Based on Open-Source Software and Standard Control Systems 284
Christian Dalheim Øien, Håkon Dahl, and Sebastian Dransfeld

Human-Centered Artificial Intelligence in Smart Manufacturing for the Operator 4.0

Towards Active Learning Based Smart Assistant for Manufacturing 295
Patrik Zajec, Jože Martin Rožanec, Inna Novalija, Blaž Fortuna, Dunja Mladenić, and Klemen Kenda

Human-AI Collaboration in Quality Control with Augmented Manufacturing Analytics 303
Alexandros Bousdekis, Stefan Wellsandt, Enrica Bosani, Katerina Lepenioti, Dimitris Apostolou, Karl Hribernik, and Gregoris Mentzas

Digital Platform and Operator 4.0 Services for Manufacturing Repurposing During COVID19 311
John Soldatos, Nikos Kefalakis, Georgios Makantasis, Angelo Marguglio, and Oscar Lazaro

Anatomy of a Digital Assistant 321
Stefan Wellsandt, Karl Hribernik, and Klaus-Dieter Thoben

Human in the AI Loop in Production Environments 331
C. Emmanouilidis, S. Waschull, J. A. C. Bokhorst, and J. C. Wortmann

Operations Management in Engineer-to-Order Manufacturing

Value Stream Mapping for Knowledge Work: A Study from Project-Based Engineering-To-Order Organization 345
Daria Larsson, Arne Gildseth, and R. M. Chandima Ratnayake

A Literature-Based Exploration of Servitization in Engineer-to-Order Companies 354
Antonio Masi, Margherita Pero, and Nizar Abdelkafi

The Unexpected Consequences of the Covid 19 on Managing ETO Projects 363
Kristina Kjersem and Marte F. Giskeødegård

Requirements for Sales and Operations Planning in an Engineer-to-Order Manufacturing Environment 371
Swapnil Bhalla, Erlend Alfnes, Hans-Henrik Hvolby, and Olumide Emmanuel Oluyisola

A Systematic Approach to Implementing Multi-sourcing Strategy in Engineer-to-Order Production 381
Deodat Mwesiumo, Bella B. Nujen, and Nina Pereira Kvadsheim

Product and Asset Life Cycle Management for Smart and Sustainable Manufacturing Systems

A Holistic Approach to PLI in Smart Maintenance Towards Sustainable Manufacturing 393
Harald Rødseth, Endre Sølvsberg, Anna Steine, Per Schjølberg, and Espen Henriksen-Polanscak

Sustainable Maintenance Performances and EN 15341:2019: An Integration Proposal 401
Chiara Franciosi, Irene Roda, Alexandre Voisin, Salvatore Miranda, Marco Macchi, and Benoit Iung

System-Level Overall Equipment Effectiveness for Improving Asset Management Performance: A Case Study Application 410
Alberto Franzini, Adalberto Polenghi, Irene Roda, and Marco Macchi

Semantic Interoperability and Sustainability an Industry 4.0 Product Life Cycle Issue 418
Yasamin Eslami, Sahand Ashouri, and Mario Lezoche

The Concept of Sustainable Maintenance Criteria Assessment. 427
Małgorzata Jasiulewicz-Kaczmarek and Katarzyna Antosz

Cost Projections for the Product Life Cycle at the Early Stages of Product Development 437
Marcin Relich, Grzegorz Bocewicz, and Zbigniew Banaszak

Robotics Technologies for Control, Smart Manufacturing and Logistics

Redundancy Resolution in Kinematic Control of Serial Manipulators in Multi-obstacle Environment 449
Wanda Zhao, Anatol Pashkevich, and Damien Chablat

Automatic Drones for Factory Inspection: The Role of Virtual Simulation . . . 457
Omid Maghazei, Torbjørn H. Netland, Dirk Frauenberger, and Tobias Thalmann

Geometric Error Modeling and Sensitivity Analysis of a Laser Pipe-Cutting System Based on Lie Group and Sobol Method 465
Yuze Jiang, Wenyu Yang, Liang Qin, and Tong Ding

Tensegrity Morphing: Machine Learning-Based Tensegrity Deformation Predictor for Traversing Cluttered Environments 473
Eduard Zalyaev and Sergei Savin

Seed-and-Prune Approach for Rapid Discovery of Tensegrity-Like Structures of the Desired Shape 481
Sergei Savin

Serious Games Analytics: Improving Games and Learning Support

Experiencing the Role of Cooperation and Competition in Operations and Supply Chain Management with a Multiplayer Serious Game 491
Matteo Galli, Davide Mezzogori, Davide Reverberi, Giovanni Romagnoli, and Francesco Zammori

Towards a Serious Game on Data Sharing in Business Ecosystems 500
Ulriikka Järvihaavisto, Mikael Öhman, and Riitta Smeds

Accessibility Considerations in the Design of Serious Games for Production and Logistics 510
Jannicke Baalsrud Hauge, Ioana Andreea Stefan, Niina Sallinen, and Jakob A. H. Baalsrud Hauge

Smart and Sustainable Production and Supply Chains

Achieving Circular and Efficient Production Systems: Emerging Challenges from Industrial Cases 523
Mélanie Despeisse, Arpita Chari, Clarissa Alejandra González Chávez, Xiaoxia Chen, Björn Johansson, Víctor Igelmo Garcia, Anna Syberfeldt, Tarek Abdulfatah, and Alexey Polukeev

Value Stream Mapping (VSM) to Evaluate and Visualize Interrelated Process-Chains Regarding Circular Economy 534
Jeff Mangers, Meysam Minoufekr, and Peter Plapper

Research on a Preannounced Pricing Policy in a Two-Period Dual-Channel Supply Chain 543
Haijiao Li, Kuan Yang, and Guoqing Zhang

Sustainable and Resilience Improvement Through the Design for Circular Digital Supply Chain 550
Abla Chaouni Benabdellah, Kamar Zekhnini, and Anass Cherrafi

A Literature Review on Smart Technologies and Logistics 560
Xingwei Lu, Xianhao Xu, and Yeming Gong

A Robust Optimization Model for a Community Healthcare Service Network Design Problem 568
Congke Wang, Yankui Liu, Jinfeng Li, and Guoqing Yang

A Review of Explainable Artificial Intelligence. 574
Kuo-Yi Lin, Yuguang Liu, Li Li, and Runliang Dou

The Impact of the Number of Regulated Suppliers in Green Supply Chain Action on Financial Performance 585
Xuanchang Qi and Hanhui Hu

Digitalization for Resilience and Sustainability During the Covid-19 Pandemic: An Explorative Event Study 591
Seyoum Eshetu Birkie

Smart Methods and Techniques for Sustainable Supply Chain Management

Minimising Total Costs of a Two-Echelon Multi-Depot Capacitated Vehicle Routing Problem (2E-MD-CVRP) that Describes the Utilisation of the Amsterdam City Canal Network for Last Mile Parcel Delivery 603
Bartje Alewijnse and Alexander Hübl

Evaluating the Deployment of Collaborative Logistics Models for Local Delivery Services 613
Andrea Bari, Fabio Salassa, Maurizio Arnone, and Tiziana Delmastro

Suppliers Selection Ontology for Viable Digital Supply Chain Performance. . . . 622
Kamar Zekhnini, Anass Cherrafi, Imane Bouhaddou, and Abla Chaouni Benabdellah

Green Supply Chain Management: A Meta-analysis of Recent Reviews 632
Eleonora Bottani and Teresa Murino

Development of an Eco-efficiency Distribution Model: A Case Study of a Danish Wholesaler 641
Malte Herold Jeberg, Simon Hummelshøj Sloth, Janus Haslund Løgtved, Hans-Henrik Hvolby, and Kenn Steger-Jensen

The New Digital Lean Manufacturing Paradigm

The Automation of Lean Practices: Digitalized or Digitally Wasted? 651
Jamila Alieva and Daryl Powell

Study of the Predictive Mechanism with Big Data-Driven Lean Manufacturing and Six Sigma Methodology 662
Hong Chen, JianDe Wu, Wei Zhang, Qing Guo, and HuiFeng Lu

Industry 4.0: Expectations, Impediments and Facilitators 673
Sergio Miele Ruggero, Nilza Aparecida dos Santos, Antonio Carlos Estender, and Marcia Terra da Silva

Implementation of Digital Tools for Lean Manufacturing: An Empirical Analysis 681
Bassel Kassem and Alberto Portioli Staudacher

Reflections from a Hybrid Approach Used to Develop a Specification of a Shopfloor Platform for Smart Manufacturing in an Engineered-to-Order SME 691
Yann Keiser, Shaun West, and Simon Züst

The Role of Emerging Technologies in Disaster Relief Operations: Lessons from COVID-19

Shelter Location-Allocation Problem with Vulnerabilities of Network and Disruption of Shelter During the Response Phase of Disaster 705
Sweety Hansuwa, Usha Mohan, and Viswanath Kumar Ganesan

Technologies Helping Smart Cities to Build Resilience: Focus on COVID-19 714
Helton Almeida dos Santos, Emerson da Silva Santana, Robson Elias Bueno, and Silvia Helena Bonilla

Key Success Factors for Supply Chain Sustainability in COVID-19 Pandemic: An ISM Approach 724
Surajit Bag, Peter Kilbourn, Noleen Pisa, and Mihalis Giannakis

Author Index 735