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# Advances in Production Management Systems. Artificial Intelligence for Sustainable and Resilient Production Systems. Part III

Alexandre Dolgui, Alain Bernard, David Lemoine, Gregor von Cieminski,  
David Romero

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*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.

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Alexandre Dolgui · Alain Bernard ·  
David Lemoine · Gregor von Cieminski ·  
David Romero (Eds.)


# 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 III


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Friedrichshafen, Germany

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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

Alexandre Dolgui  
Alain Bernard  
David Lemoine  
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Ivanov Dmitry  
Jacomino Mireille  
Jagdev Harinder  
Jahn Niklas  
Jain Geetika  
Jain Vipul  
Jasiulewicz-Kaczmarek Małgorzata  
Jebali Aida  
Jelusic Elena  
Jeong Yongkuk  
Johansen John  
Jones Al  
Jun Chi-Hyuck  
Jun Hong-Bae  
Jun Sungbum  
Juned Mohd  
Jünge Gabriele  
Kaasinen Eija  
Kaihara Toshiya  
Kalaboukas Kostas  
Kang Yong-Shin  
Karampatzakis Dimitris  
Kayicki Yasanur  
Kedad-Sidhoum Safia  
Keepers Makenzie  
Keivanpour Samira  
Keshari Anupam  
Kim Byung-In  
Kim Duck Young  
Kim Hwa-Joong  
Kim Hyun-Jung  
Kinra Aseem  
Kiritzis Dimitris  
Kitjacharoenchai Patchara  
Kjeldgaard Stefan  
Kjersem Kristina  
Klimchik Alexandr  
Klymenko Olena  
Kollberg Thomassen Maria  
Kolyubin Sergey  
Koomsap Pisut  
Kramer Kathrin  
Kulvatunyou Boonserm (Serm)  
Kumar Ramesh  
Kurata Takeshi  
Kvadsheim Nina Pereira  
Lahaye Sébastien  
Lalic Danijela  
Lamouri Samir  
Lamy Damien  
Landryova Lenka  
Lechner Jan-Peter  
Lee Dong-Ho  
Lee Eunji  
Lee Kangbok  
Lee Kyungsik  
Lee Minchul



Lee Seokcheon  
Lee Seokgi  
Lee Young Hoon  
Lehuédé Fabien  
Leiber Daria  
Lemoine David  
Li Haijiao  
Li Yuanfu  
Lim Dae-Eun  
Lim Ming  
Lima Adalberto da  
Lima Nilsa  
Lin Chen-ju  
Linares Jean-marc  
Linnartz Maria  
Listl Franz Georg  
Liu Ming  
Liu Xin  
Liu Zhongzheng  
Lödding Hermann  
Lodgaard Eirin  
Loger Benoit  
Lorenz Rafael  
Lu Jinzhi  
Lu Xingwei  
Lu Xuefei  
Lucas Flavien  
Lüftenegger Egon  
Luo Dan  
Ma Junhai  
Macchi Marco  
Machado Bruno 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 Marlucci 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 Ionaldo  
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 III

### Autonomous Robots in Delivery Logistics

Sustainable Facility Location-Routing Problem for Blood Package Delivery by Drones with a Charging Station . . . . .	3
<i>Shirin Ghasemi, Reza Tavakkoli-Moghaddam, Mahdi Hamid, and Meysam Hosseinzadeh</i>	
A MILP Formulation for an Automated Guided Vehicle Scheduling Problem with Battery Constraints . . . . .	15
<i>Adriano Masone, Teresa Murino, Claudio Sterle, and Monica Strazzullo</i>	
Planning Autonomous Material Transportation in Hospitals . . . . .	24
<i>Giuseppe Fragapane, Debjit Roy, Fabio Sgarbossa, and Jan Ola Strandhagen</i>	
Collaborative Hybrid Delivery System: Drone Routing Problem Assisted by Truck . . . . .	33
<i>Ho Young Jeong and Seokcheon Lee</i>	
Drone Delivery Vehicle Routing Problem with Multi-flight Level . . . . .	43
<i>Yonggab Kim, Hoyoung Jung, and Seokcheon Lee</i>	

### Digital Transformation Approaches in Production Management

Multi-perspective View on Sustainable Production: A Literature Review . . . . .	55
<i>Marko Samardzic and Ugljesa Marjanovic</i>	
Determining Minimal Cost of Action for Task Allocation Within Mobile Robot Swarm in Production Environments . . . . .	64
<i>Elmir Babović, Denis Mušić, Bahrudin Hrnjica, and Adil Joldić</i>	
A Hybrid Architecture for the Deployment of a Data Quality Management (DQM) System for Zero-Defect Manufacturing in Industry 4.0 . . . . .	71
<i>Chiara Caccamo, Ragnhild Eleftheriadis, Maria Chiara Magnanini, Daryl Powell, and Odd Myklebust</i>	
The Survival Analysis for a Predictive Maintenance in Manufacturing . . . . .	78
<i>Bahrudin Hrnjica and Selver Softic</i>	
Detection of Fluid Level in Bores for Batch Size One Assembly Automation Using Convolutional Neural Network . . . . .	86
<i>Alexej Simeth, Jessica Plaßmann, and Peter Plapper</i>	

Barriers Hindering an Efficient Implementation Process of Digital Technologies; a Case Study at Norwegian Manufacturing Companies . . . . .	94
<i>Eirin Lodgaard, Hans Torvatn, Johanne Sørumsbrenden, and Gaute Andreas Knutstad</i>	
Consistent Maintenance Order Processing with Digital Assistance Systems . . . . .	102
<i>Robert Rost and Axel Friedewald</i>	
Supporting Manufacturing Processes Design Using Stakeholder Opinions and Sentiment Analysis . . . . .	112
<i>Egon Lüftenegger and Selver Softic</i>	
Digitalization in Manufacturing: Trends, Drivers, Challenges, and Research Areas in Norway. . . . .	118
<i>Emrah Arica and Daryl Powell</i>	
Exploring Accidental Digital Servitization in an Industrial Context . . . . .	126
<i>Matthew Anderson, Shaun West, and David Harrison</i>	
<b>Finance-Driven Supply Chain</b>	
Financing and Cost Sharing for a Supply Chain Under CSR - Sensitive Demand . . . . .	139
<i>Franck Moraux, Dinh Anh Phan, and Thi Le Hoa Vo</i>	
Integrated Business Planning Process: Link Between Supply Chain Planning and Financial Planning . . . . .	149
<i>Mohamed Haythem Selmi, Zied Jemai, Laurent Gregoire, and Yves Dallery</i>	
An EOQ-Based Lot Sizing Model with Working Capital Requirements Financing Cost . . . . .	159
<i>Yuan Bian, David Lemoine, Thomas G. Yeung, Nathalie Bostel, Vincent Hovelaque, and Jean-Laurent Viviani</i>	
Put Option Contracts in Newsvendor Model with Bankruptcy Risk . . . . .	167
<i>Pooya Hedayatinia, David Lemoine, Guillaume Massonnet, and Jean-Laurent Viviani</i>	
Pricing Decisions for an Omnichannel Retailing Under Service Level Considerations . . . . .	175
<i>Minh Tam Tran, Yacine Rekik, and Khaled Hadj-Hamou</i>	

## Gastronomic Service System Design

Forecasting the Number of Customers Visiting Restaurants Using Machine Learning and Statistical Method . . . . .	189
<i>Takashi Tanizaki, Shunsuke Kozuma, and Takeshi Shimmura</i>	
Digital Ordering Improves Labor Productivity in Multiproduct Restaurants. . .	198
<i>Takeshi Shimmura and Syuichi Oura</i>	
Geospatial Intelligence for Health and Productivity Management in Japanese Restaurants and Other Industries . . . . .	206
<i>Takeshi Kurata</i>	
Engineering Large Event Catering Services . . . . .	215
<i>Kai-Wen Tien and Vittaldas V. Prabhu</i>	
A Study on Menu Planning Method Considering the Variation in Menu Orders - Application to Daily Foods in a Company Cafeteria . . . . .	224
<i>Ruriko Watanabe, Nobutada Fujii, Daisuke Kokuryo, Toshiya Kaihara, Kyohei Irie, Kenji Yanagita, and Kenichi Harada</i>	
Systems Engineering Analysis for Cooking Recipes from the Perspective of Work Instructions . . . . .	232
<i>Tomomi Nonaka, Kaoru Kamatani, and Nobutada Fujii</i>	

## Modern Scheduling and Applications in Industry 4.0

Electric Bus Charging Scheduling Strategy with Stochastic Arrival Time and State of Charge. . . . .	241
<i>Ming Liu, Yueyu Ding, Feng Chu, Feifeng Zheng, and Chengbin Chu</i>	
Group Scheduling and Due Date Assignment Without Restriction on a Single Machine . . . . .	250
<i>Ying Chen and Yongxi Cheng</i>	
Parallel Machine Scheduling with Stochastic Workforce Skill Requirements. . . . .	258
<i>Xin Liu and Ming Liu</i>	
Multitasking Scheduling Problem with Uncertain Credit Risk . . . . .	266
<i>Feifeng Zheng, Zhaojie Wang, Yinfeng Xu, and Ming Liu</i>	
A Mathematical Model for Bus Scheduling with Conditional Signal Priority . . . . .	274
<i>Ming Liu, Yecheng Zhao, Feng Chu, Feifeng Zheng, and Chengbin Chu</i>	
Charging Scheduling Optimization of Battery Electric Bus with Controllable Task Completion. . . . .	282
<i>Feifeng Zheng, Zhixin Wang, Yinfeng Xu, and Ming Liu</i>	

Research on the O2O Takeout Orders Merger and Routing Optimization . . . .	290
<i>Wenjie Wang, Xue Xia, Lei Xie, Li Jiang, and Yangyun Song</i>	
A MILP Model for the Scheduling of a Multiproduct Tree-Structure Pipeline Network in Mining Industry . . . . .	299
<i>M. Bamoumen, S. Elfirdoussi, L. Ren, and N. Tchernev</i>	
Exploiting the Full Potential of I4.0 Technologies for Products EOL Recovery Process . . . . .	307
<i>Valentina Popolo, Mose Gallo, Andrea Grassi, and Maria Grazia Marchesano</i>	
An Approximation Algorithm for the k-Connected Location Set Cover Problem with Color-Spanning Constraint . . . . .	317
<i>Yin Wang and Yinfeng Xu</i>	

### **Recent Advances in Sustainable Manufacturing**

Sustainable Process Plan Generation in RMS: A Comparative Study of Two Multi-objective Evolutionary Approaches . . . . .	329
<i>Imen Khettabi, Lyes Benyoucef, and Mohamed Amine Boutiche</i>	
How Is Value Created in the Circular Economy? Evidence from Remanufacturing and Repair Businesses. . . . .	340
<i>Melissa Correa Marques, Umit Sezer Bititci, and Amos Peter Haniff</i>	
Modeling the Parallel Machine Scheduling Problem with Worker- and Position-Dependent Processing Times . . . . .	351
<i>Jairo R. Montoya-Torres, Valérie Botta-Genoulaz, Nick Materzok, Borgeir Páll Gislason, and Sélène Mendiela</i>	
The Most Critical Decisions in Manufacturing: Implications for a Circular Economy . . . . .	360
<i>Nina Pereira Kvadsheim, Bella B. Nujen, and Deodat Mwesiumo</i>	
Challenges in Setting up a Production Line During Pandemic. . . . .	369
<i>Kiwook Jung, Scott Nieman, and Boonserm Kulvatunyou</i>	

### **Green Production and Circularity Concepts**

Developing a Qualitative Maturity Scale for Circularity in Manufacturing . . .	377
<i>Federica Acerbi, Vafa Järnefelt, Jorge Tiago Martins, Leila Saari, Katri Valkokari, and Marco Taisch</i>	
Business Models in Circular Economy: A Systematic Literature Review . . . .	386
<i>Beatrice Colombo, Paolo Gaiardelli, Stefano Dotti, and Albachiara Boffelli</i>	

Industry 4.0 Driven Quantitative Methods for Circular Supply Chains: A Bibliometric Analysis. . . . .	394
<i>Biman Darshana Hettiarachchi, Stefan Seuring, and Marcus Brandenburg</i>	
Rethinking Circular Business Models: The Role of the Learning Factory . . . .	402
<i>Maria Flavia Mogos, Sigurd Sagen Vildåsen, Johanne Sørumsbrenden, and Daryl Powell</i>	
Crop Selection and Scheduling for Green Production with Intercropping and Rotation. . . . .	411
<i>Canan Pehlivan, Thomas G. Yeung, and Aline Suzette Alvarado Munguia</i>	
<b>Improvement Models and Methods for Green and Innovative Systems</b>	
Generation Y – Modularity Enabling Radical Innovation . . . . .	423
<i>Bjørnar Henriksen and Carl Christian Røstad</i>	
Disassembly Line Balancing Using Recursive Optimization in Presence of Task-Failure . . . . .	430
<i>Rakshit Kumar Singh, Amit Raj Singh, and Ravindra Kumar Yadav</i>	
Quantity-Flexibility Contract Models for the Supply Chain with Green-Sensitive Demand in the Automotive Manufacturing Industry . . .	441
<i>Zhe Yuan, Yeming Gong, and Mingyang Chen</i>	
How Much Green Investments Are Efficient for a Smart Production System?. . . . .	450
<i>Rekha Guchhait, Mitali Sarkar, and Biswajit Sarkar</i>	
Demand Driven Material Requirements Planning Buffer Positioning Considering Carbon Emissions . . . . .	460
<i>Achergui Abdelhalim, Allaoui Hamid, and Hsu Tiente</i>	
<b>Supply Chain and Routing Management</b>	
Reinforcement Learning for Layout Planning – Modelling the Layout Problem as MDP . . . . .	471
<i>Hendrik Unger and Frank Börner</i>	
Supply Chain Management by Blockchain . . . . .	480
<i>Gianfranco Genta, Agostino Villa, and Gianni Piero Perrone</i>	



Optimization of Hierarchical Production Planning with Setup Time Feasibility for Effective Supply Chain Management. . . . .	489
<i>Guisen Xue and O. Felix Offodile</i>	
Integrated Planning of IoT-Based Smart Bin Allocation and Vehicle Routing in Solid Waste Management. . . . .	499
<i>Arindam Roy, Apurba Manna, Jungmin Kim, and Ilkyeong Moon</i>	
Smart Contracts Implementation in the Allocation of Covid-19 Vaccines . . . .	510
<i>Mohammad Amin Yazdani, Daniel Roy, and Sophie Hennequin</i>	
<b>Robotics and Human Aspects</b>	
Methods of Forecasting Environmental Stress and Strain on Working Humans in the Digital Factory . . . . .	523
<i>Gert Zülch</i>	
Paraconsistent Annotated Evidential Logic E Applied to Autonomous Robots in Logistic Center. . . . .	533
<i>Flávio Amadeu Bernardini, Marcia Terra da Silva, Jair Minoro Abe, and Luiz Antonio de Lima</i>	
Human Aspects in Collaborative Order Picking – What if Robots Learned How to Give Humans a Break? . . . . .	541
<i>Yaxu Niu and Frederik Schulte</i>	
Assembly System 4.0: Human-Robot Collaboration in Assembly Operations . . . . .	551
<i>Gursel A. Suer, Najat Almasarwah, Jesus Pagan, and Yuqiu You</i>	
An Integrated QFD Approach for Industrial Robot Selection . . . . .	561
<i>Gülçin Büyükoçkan, Öykü Ilıcak, and Orhan Feyzioğlu</i>	
<b>Classification and Data Management Methods</b>	
Dissimilarity to Class Medoids as Features for 3D Point Cloud Classification . . . . .	573
<i>Sylvain Chabanet, Valentin Chazelle, Philippe Thomas, and Hind Bril El-Haouzi</i>	
A Comparative Study of Classification Methods on the States of the USA Based on COVID-19 Indicators . . . . .	582
<i>İbrahim Miraç Eligüzel and Eren Özceylan</i>	
Maintenance Data Management for Condition-Based Maintenance Implementation . . . . .	591
<i>Humberto Teixeira, Catarina Teixeira, and Isabel Lopes</i>	

A Machine Learning Based Health Indicator Construction in Implementing Predictive Maintenance: A Real World Industrial Application from Manufacturing . . . . .	599
<i>Harshad Kurrewar, Ebru Turanoglu Bekar, Anders Skoogh, and Per Nyqvist</i>	

Development of Convolutional Neural Network Architecture for Detecting Dangerous Goods for X-ray Aviation Security in Artificial Intelligence . . . . .	609
<i>Woong Kim and Chulung Lee</i>	

### **Smart Supply Chain and Production in Society 5.0 Era**

Coalition Analysis on Two Manufactures and Two Retailers Supply Chain via Cooperative Game Theory . . . . .	619
<i>Taiki Saso and Tatsushi Nishi</i>	

Supply Chain Optimization Through Cooperative Negotiation by Using Backward Scheduling . . . . .	629
<i>Yoshitaka Tanimizu and Rika Kanbara</i>	

A Proposal of Scheduling Method Based on Decision Criteria Considering Electric Power Costs and Productivity . . . . .	637
<i>Masayuki Yabuuchi, Toshiya Kaihara, Nobutada Fujii, Daisuke Kokuryo, Mio Nonaka, and Kotone Senju</i>	

A New Representation and Adaptive Feature Selection for Evolving Compact Dispatching Rules for Dynamic Job Shop Scheduling with Genetic Programming . . . . .	646
<i>Salama Shady, Toshiya Kaihara, Nobutada Fujii, and Daisuke Kokuryo</i>	

A Study on Sharing Logistics Network Design Considering Demand Uncertainty . . . . .	655
<i>Asumi Ito, Toshiya Kaihara, Daisuke Kokuryo, and Nobutada Fujii</i>	

Reshaping the Supply Chain for Society 5.0. . . . .	663
<i>Rosanna Fornasiero and Andrea Zangiacomi</i>	

### **Supply Chain Risk Management Under Coronavirus**

A Tabu Search Heuristic for the Robust Dynamic Bayesian Network Optimisation Problem Under the Supply Chain Ripple Effect . . . . .	673
<i>Ming Liu, Hao Tang, Feng Chu, Feifeng Zheng, and Chengbin Chu</i>	

A New Robust Dynamic Bayesian Network Model with Bounded Deviation Budget for Disruption Risk Evaluation . . . . .	681
<i>Ming Liu, Tao Lin, Feng Chu, Feifeng Zheng, and Chengbin Chu</i>	

Stochastic Integrated Supplier Selection and Disruption Risk Assessment Under Ripple Effect ..... 689  
*Ming Liu, Zhongzheng Liu, Feng Chu, Feifeng Zheng, and Chengbin Chu*

Pharmaceutical Supply Chain Risk Assessment in the Time of COVID 19/Case Study. .... 697  
*Jihene Jlassi, Nesrin Halouani, and Abderrahman El Mhamedi*

**Author Index** ..... 705