

Editor-in-Chief

A. Joe Turner, Seneca, SC, USA

Editorial Board

Foundations of Computer Science

Mike Hinchey, Lero, Limerick, Ireland

Software: Theory and Practice

Michael Goedicke, University of Duisburg-Essen, Germany

Education

Arthur Tatnall, Victoria University, Melbourne, Australia

Information Technology Applications

Ronald Waxman, EDA Standards Consulting, Beachwood, OH, USA

Communication Systems

Guy Leduc, Université de Liège, Belgium

System Modeling and Optimization

Jacques Henry, Université de Bordeaux, France

Information Systems

Jan Pries-Heje, Roskilde University, Denmark

ICT and Society

Jackie Phahlamohlaka, CSIR, Pretoria, South Africa

Computer Systems Technology

Paolo Prinetto, Politecnico di Torino, Italy

Security and Privacy Protection in Information Processing Systems

Kai Rannenber, Goethe University Frankfurt, Germany

Artificial Intelligence

Tharam Dillon, Curtin University, Bentley, Australia

Human-Computer Interaction

Annelise Mark Pejtersen, Center of Cognitive Systems Engineering, Denmark

Entertainment Computing

Ryohei Nakatsu, National University of Singapore

IFIP – The International Federation for Information Processing

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

IFIP's mission is to be the leading, truly international, apolitical organization which encourages and assists in the development, exploitation and application of information technology for the benefit of all people.

IFIP is a non-profitmaking organization, run almost solely by 2500 volunteers. It operates through a number of technical committees, which organize events and publications. IFIP's events range from an international congress to local seminars, but the most important are:

- The IFIP World Computer Congress, held every second year;
- Open conferences;
- Working conferences.

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 small and 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.

Any national society whose primary activity is about information processing may apply to become a full member of IFIP, although full membership is restricted to one society per country. Full members are entitled to vote at the annual General Assembly, National societies preferring a less committed involvement may apply for associate or corresponding membership. Associate members enjoy the same benefits as full members, but without voting rights. Corresponding members are not represented in IFIP bodies. Affiliated membership is open to non-national societies, and individual and honorary membership schemes are also offered.

Christos Emmanouilidis Marco Taisch
Dimitris Kiritsis (Eds.)

Advances in Production Management Systems

Competitive Manufacturing
for Innovative Products and Services

IFIP WG 5.7 International Conference, APMS 2012
Rhodes, Greece, September 24-26, 2012
Revised Selected Papers, Part I



Springer

Volume Editors

Christos Emmanouilidis
ATHENA Research and Innovation Centre
in Information Communication and Knowledge Technologies
ATHENA RIC Building, University Campus, Kimeria, 67100 Xanthi, Greece
E-mail: chrise@ceti.athena-innovation.gr

Marco Taisch
Politecnico di Milano
Department of Management, Economics, and Industrial Engineering
Piazza Leonardo da Vinci, 32, 20133 Milano, Italy
E-mail: marco.taisch@polimi.it

Dimitris Kiritsis
École Polytechnique Fédérale de Lausanne (EPFL)
STI-IGM-LICP, ME A1 396, Station 9, 1015 Lausanne, Switzerland
E-mail: dimitris.kiritsis@epfl.ch

ISSN 1868-4238

e-ISSN 1868-422X

ISBN 978-3-642-40351-4

e-ISBN 978-3-642-40352-1

DOI 10.1007/978-3-642-40352-1

Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2013944965

CR Subject Classification (1998): J.1, J.7, I.2, H.1, H.4, C.2, K.4.3

© IFIP International Federation for Information Processing 2013

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

Since the first conference that took place in Helsinki back in 1990, APMS is one of the major events and the official conference of the IFIP Working Group 5.7 on Advances in Production Management Systems. Recently, APMS successfully took place in Washington (USA, 2005), Wroclaw (Poland, 2006), Linköping (Sweden, 2007), Espoo (Finland, 2008), Bordeaux (France, 2009), Cernobbio (Italy, 2010), and Stavanger (Norway 2011).

APMS 2012 was sponsored by the IFIP WG 5.7 and co-sponsored by the ATHENA Research & Innovation Centre and the Hellenic Maintenance Society in Greece. In an era of increased globalization and ever-pressing needs for improved efficiency, the APMS 2012 theme was “Competitive Manufacturing for Innovative Products and Services.” In this setting, among the key elements of success in modern manufacturing and production management are:

- **Resource Efficiency:** the ability to perform in a resource-efficient manner throughout the lifecycle of a production process, product use or offered services.
- **Key Enabling Technologies:** the exploitation of the latest materials, manufacturing and production control technologies to support competitive and sustainable production.
- **Networked Enterprise and Global Manufacturing and Supply Chains:** the ability to operate as a globally interconnected organization and perform at a global scale, both at an intra- and inter-organizational scale.
- **Knowledge Intensity and Exploitation:** the efficient use of enterprise and human resources tangible and intangible knowledge, including efficient knowledge lifecycle management.
- **Innovation:** the ability to efficiently port R&D results into competitive new forms of production, products or services.

The APMS 2012 conference brought together leading experts from industry, academia and governmental organizations. They presented the latest developments in production management systems and debated how to shape up the future of competitive manufacturing. It comprised seven keynote talks and 36 sessions, including a dedicated Industry Panel Session, to offer the practitioners’ view on linking research to industry, thus efficiently supporting the innovation process. The keynotes offered insight into cutting-edge issues of production management and its future, comprising the following talks:

- “A Business Perspective for Manufacturing Research,” Jochen Rode, SAP
- “ICT-Driven Innovation in the Factories of the Future,” Rolf Riemenschneider, European Commission
- “Sustainable Manufacturing: Towards a Competitive Industrial Base in Europe,” Filip Geerts, CECIMO

- “ICT Integration Challenges in Manufacturing: From the Device to the Enterprise Level,” Thilo Sauter, Austrian Academy of Sciences
- “The IMS Global Platform Services for Manufacturing Research and Innovation,” Dan Nagy, IMS
- “Energy Management Operations in Shipping Industry,” Takis Varelas, DANAOS
- “The FoF PPP Call in WP2013 and Future Opportunities for Manufacturing R&I in Horizon2020,” Andrea Gentili, European Commission

Industry and academia converged in a stimulating Industry Panel Session, organized by Prof. Hermann Loedding and Dr. Gregor Alexander von Cieminski. The session theme was “Linking Research to Industry: The Practitioner’s view on Competitive Manufacturing for Innovative Products and Services.” The following panellist talks introduced the session discussion:

- “Leadership in Electronics Operations @Continental,” Wolfgang Menzel, Continental
- “Integrating Industrial Needs with Academic Perspectives — Concept and Realization of the RWTH Aachen High Tech Campus,” Volker Stich, RWTH Aachen

Wolfgang Menzel and Volker Stich were joined in the panel by Paul Schönsleben (ETH), Dan Nagy, IMS and Filip Geerts, CECIMO and debated about the crucial linkage between research and industry in order to shed light on what constitutes successful practices in bringing forward R&D from the lab to industry-relevant innovation. The panel argued that higher education institutions should offer opportunities to students to undertake part of their studies in industry, with this being acknowledged and recognized as a formal part of education. Furthermore, industry could have more active presence within public research and educational campuses and FIR-RWTH Aachen was presented as an example of such an endeavor. Emphasis was placed on the industrial relevance of research, which would depart from theoretical solutions for “non-relevant” problems to conducting “relevant” research offering pragmatic and innovative solutions to industry.

Several special sessions were organized and ongoing research initiatives and projects presented their progress and results. A PhD Workshop was held prior to the conference, chaired by Sergio Cavalieri (University of Bergamo) and offered the opportunity to PhD researchers to present their research plans, objectives, and results to scientific discussants and gain valuable feedback to strengthen their research plan and activities.

At the conclusion of the conference, following the APMS tradition, the conference offered the following awards:

- Burbidge award for best paper to Dimitris Mourtzis (University of Patras)
- Burbidge award for best presentation to Morten Lund (University of Aalborg)

- Best PhD workshop paper award to Elzbieta Pawlik (University of Strathclyde)

Approximately 240 academics, researchers, practitioners and scientists from 31 countries joined the APMS 2012 conference, sharing their expertise and providing insight into what constitutes the currently best practice in manufacturing and production management, while also projecting into the future of competitive manufacturing for innovative products and services. The conference involved a high-quality International Steering and a Scientific Committee of acknowledged excellence, while the review process involved 73 experts, all making key contributions to the conference success. The conference program included 196 regular presentations and 11 PhD workshop presentations. The review process involved pre-conference extended abstracts reviews and a post-conference full paper review process, followed by a final paper submission by the authors, addressing the review comments. The result of this process is the present two-volume edited proceedings, comprising 182 full papers, organized under the following sections:

- Part I, Sustainability, including Energy Efficient Manufacturing, Sustainable Value Creation, Business Models and Strategies
- Part II, Design, Manufacturing and Production Management, including Mass Customization, Products of the Future and Manufacturing Systems Design, Advanced Design, Manufacturing and Production Management, as well as Robotics in Manufacturing
- Part III, Human Factors, Learning and Innovation, including Modern Learning in Manufacturing and Production Systems, Human Factors, Quality and Knowledge Management, as well as Innovation in Products and Services in Developing Countries
- Part IV, ICT and Emerging Technologies in Production Management, including Emerging Technologies in Production and the Lifecycle Management of Products and Assets, Enterprise Integration and Interoperability, as well as ICT for Manufacturing, Services and Production Management
- Part V, Product and Asset Lifecycle Management, including Product Lifecycle Management, Asset Lifecycle Management, as well as Performance and Risk Management
- Part VI, Services, Supply Chains and Operations, including Services, Managing International Operations, Supply Networks and Supply Chain Management, as well as Production Management, Operations and Logistics

We wish to acknowledge the support of **Intelligent Manufacturing Systems (IMS)** for the USB sticks and Lanyards for badges, as well as **Prisma Electronics SA** for sponsoring the APMS 2012 Welcome Reception.

We wish to thank the active members of the IFIP WG 5.7 community for their contribution and support of the conference, their support in the papers review process and the promotion of APMS 2012 through their networks and collaborating partners. Particular thanks are due to the **ATHENA Research and Innovation Centre** and the **Hellenic Maintenance Society** in Greece

for co-sponsoring and supporting the conference and Zita Congress SA for their professional conference management services.

The conference was hosted on the island of Rhodes, Greece, a world-class destination, boasting a unique mixture of ancient and modern with holiday attractions and a continuing history of well over three millennia. According to mythology, Rhodes was created by the union of Helios, the Titan personalizing the sun, and the nymph Rhode. The ancient city of Rhodes hosted one of the ancient wonders of the world, the Colossus of Rhodes, a giant statue of Helios. Manufacturing and production management have made giant strides and continue to contribute toward a world of smart, sustainable and inclusive growth, but much more needs to be done and a global effort is needed to continue pushing toward such ends. The APMS 2012 conference constituted a focused effort and contribution in supporting such aims. We hope that the present two-volume set will be of interest to the industrial and academic communities working in the area of manufacturing and production management and the associated enabling technologies.

February 2013

Christos Emmanouilidis
Marco Taisch
Dimitris Kiritsis

Organization

The APMS 2012 conference was sponsored by the IFIP WG 5.7 Advances in Production Management Systems, co-sponsored by the ATHENA Research & Innovation Centre, in Information, Communication and Knowledge Technologies, Greece, and co-sponsored by the Hellenic Maintenance Society (HMS), Greece.

Conference Chair

Christos Emmanouilidis ATHENA Research & Innovation Centre,
Greece

Conference Co-chairs

Marco Taisch Politecnico di Milano, Italy
Dimitris Kiritsis Ecole Polytechnique Fédérale de Lausanne,
Switzerland

APMS 2012 International Advisory Board

Christos Emmanouilidis ATHENA R.I.C., Greece
Jan Frick University of Stavanger, Norway
Dimitris Kiritsis EPFL, Switzerland
Vidosav Majstorovich University of Belgrade, Serbia
Riitta Smeds Aalto University, Finland
Volker Stich FIR - RWTH Aachen, Germany
Marco Taisch Politecnico di Milano, Italy
Bruno Vallespir University of Bordeaux, France

APMS 2012 Doctoral Workshop Chair

Sergio Cavalieri University of Bergamo, Italy

APMS 2012 Local Organizing Committee

Christos Emmanouilidis ATHENA R.I.C, Greece
Athanasios Kalogeras ATHENA R.I.C, Greece
Zacharias Kaplanidis Zita Congress, Greece
Irimi Katti Zita Congress, Greece
Christos Koulamas ATHENA R.I.C, Greece
Dimitris Karampatzakis ATHENA R.I.C, Greece
Nikos Papatthanasiou ATHENA R.I.C, Greece
Petros Pistofidis ATHENA R.I.C, Greece

APMS 2012 Conference Secretariat

Zita Congress SA

Attica, Greece

International Scientific Committee

Bjørn Andersen	Norwegian University of Science and Technology, Norway
Abdelaziz Bouras	University of Lyon, France
Luis M. Camarinha-Matos	New University of Lisbon, Portugal
Sergio Cavalieri	University of Bergamo, Italy
Stephen Childe	University of Exeter, UK
Alexandre Dolgui	Ecole des Mines de Saint-Etienne, France
Guy Doumeingts	University Bordeaux, France
Heidi C. Dreyer	Norwegian University of Technology and Science, Norway
Christos Emmanouilidis	ATHENA Research & Innovation Centre, Greece
Peter Falster	Technical University of Denmark, Denmark
Rosanna Fornasiero	ITIA-CNR, Italy
Jan Frick	University of Stavanger, Norway
Susumu Fujii	Sophia University, Japan
Marco Garetti	Politecnico di Milano, Italy
Antonios Gasteratos	Democritus University of Thrace, Greece
Bernard Grabot	Ecole Nationale d'Ingénieurs de TARBES, France
Robert W. Grubbström	Linköping Institute of Technology, Sweden
Thomas Gulledge	George Mason University, USA
Hans-Henrik Hvolby	University of Aalborg, Denmark
Harinder Jagdev	National University of Ireland, Ireland
Athanassios Kalogeras	ATHENA Research & Innovation Centre, Greece
Dimitris Kiritsis	EPFL, Switzerland
Christos Koulamas	ATHENA Research & Innovation Centre, Greece
Andrew Kusiak	University of Iowa, USA
Lenka Landryova	VSB Technical University Ostrava, Czech Republic
Ming Lim	Aston University, UK
Hermann Lödding	Technical University of Hamburg, Germany
Vidoslav D. Majstorovic	University of Belgrade, Serbia
Kepa Mendibil	University of Strathclyde, UK
Kai Mertins	Fraunhofer IPK, Germany
Hajime Mizuyama	Kyoto University, Japan
Irenilza Nääs	Universidade Paulista, Brazil
Gilles Neubert	ESC Saint-Etienne, France

Jan Olhager	Linköping University, Sweden
Jens Ove Riis	University of Alborg, Denmark
Henk Jan Pels	Eindhoven University of Technology, Netherlands
Selwyn Piramuthu	University of Florida, USA
Alberto Portioli	Politecnico di Milano, Italy
Asbjorn Rolstadas	Norwegian University of Science and Technology, Norway
Paul Schoensleben	ETH Zurich, Switzerland
Dan L. Shunk	Arizona State University, USA
Riitta Smeds	Aalto University, Finland
Vijay Srinivasan	National Institute of Standards and Technology, USA
Kenn Steger-Jensen	Aalborg University, Denmark
Kathryn E. Stecke	University of Texas, USA
Volker Stich	FIR RWTH Aachen, Germany
Richard Lee Storch	University of Washington, USA
Jan Ola Strandhagen	SINTEF, Norway
Stanisław Strzelczak	Warsaw University of Technology, Poland
Marco Taisch	Politecnico di Milano, Italy
Ilias Tatsiopoulos	National Technical University of Athens, Greece
Sergio Terzi	University of Bergamo, Italy
Klaus-Dieter Thoben	University of Bremen/BIBA, Germany
Mario Tucci	University of Florence, Italy
Bruno Vallespir	University of Bordeaux, France
Agostino Villa	Politecnico di Torino, Italy
Gregor Alexander von Cieminski	ZF Friedrichshafen AG, Germany
Dan Wang	Harbin Institute of Technology, China
J.C. Wortmann	University of Groningen, The Netherlands
Iveta Zolotová	Technical University of Košice, Slovakia

External Reviewers

Alexander von Cieminski, Gregor Andersen Bjorn	ZF Friedrichshafen AG, Germany Norwegian University of Science and Technology, Norway
Battaïa Olga	EMSE, France
Bouras Abdelaziz	Lumière University Lyon 2, France
Camarinha-Matos Luis M.	New University of Lisbon, Portugal
Cavalieri Sergio	University of Bergamo, Italy
Childe Stephen	University of Exeter, UK
Corti Donatella	Politecnico di Milano, Italy
Dolgui Alexandre	Ecole des Mines de Saint-Etienne, France

Dreyer Heidi C.	Norwegian University of Technology and Science (NTNU), Norway
Emmanouilidis Christos	ATHENA Research & Innovation Centre, Greece
Errasti Ander	TECNUN University of Navarra, Spain
Evans Steve	University of Cambridge, UK
Eynard Benoit	Université de Technologie de Compiègne, France
Falster Peter	Technical University of Denmark, Denmark
Fornasiero Rosanna	ITIA-cnr, Italy
Frick Jan	University of Stavanger, Norway
Garetti Marco	Politecnico di Milano, Italy
Gasteratos Antonios	Democritus University of Thrace, Greece
Grabot Bernard	Ecole Nationale d'Ingenieurs de TARBES, France
Grubbstrom Robert W.	Linkoping Institute of Technology, Sweden
Hvolby Hans-Henrik	Aalborg University, Denmark
Jagdev Harinder	National University of Ireland, Galway, Ireland
Kaihara Toshiya	Kobe University, Japan
Kalogeras Athanasios	ATHENA Research & Innovation Centre, Greece
Karampatzakis Dimitris	ATHENA Research & Innovation Centre, Greece
Kiritsis Dimitris	EPFL, Switzerland
Koulamas Christos	ATHENA Research & Innovation Centre, Greece
Krüger Volker	Aalborg University, Denmark
Landryova Lenka	VSB - Technical University of Ostrava, Czech Republic
Lim Ming	University of Derby, UK
Loedding Hermann	Technical University of Hamburg, Germany
Macchi Marco	Politecnico di Milano, Italy
Majstorovic Vidosav D.	University of Belgrade, MEF, Serbia
Mandic Vesna	University of Kragujevac, Serbia
May Gökan	Politecnico di Milano, Italy
Mendibil Kepa	University of Strathclyde, UK
Mertins Kai	Fraunhofer IPK/TU Berlin, Germany
Mizuyama Hajime	Aoyama Gakuin University, Japan
Nääs Irenilza	Paulista University-UNIP, Brazil
Netland Torbjoern H.	Norwegian University of Science and Technology, Norway
Neubert Gilles	Ecole Supérieure de Commerce, France
Olhager Jan	Lund University, Sweden
Oliveira Manuel F.	SINTEF, Norway

Pels Henk Jan	Eindhoven University of Technology, The Netherlands
Piramuthu Selwyn	University of Florida, USA
Pistofidis Petros	ATHENA Research & Innovation Centre, Greece
Portioli Alberto	Politecnico di Milano, Italy
Pourabdollahian Borzoo	Politecnico di Milano, Italy
Pourabdollahian Golboo	Politecnico di Milano, Italy
Riis Jens Ove	Aalborg University, Denmark
Sauter Thilo	Austrian Academy of Sciences, Austria
Schoensleben Paul	ETH Zurich, Switzerland
Shunk Dan L.	Arizona State University, USA
Smeds Riitta	Aalto University, Finland
Srinivasan Vijay	National Institute of Standards and Technology, USA
Stahl Bojan	Politecnico di Milano, Italy
Stecke Kathryn E.	University of Texas at Dallas, USA
Steger-Jensen Kenn	Aalborg University, Denmark
Stich Volker	FIR RWTH Aachen, Germany
Storch Richard Lee	University of Washington, USA
Strzelczak Stanislaw	Warsaw University of Technology, Poland
Taisch Marco	Politecnico di Milano, Italy
Tatsiopoulos Ilias	National Technical University of Athens, Greece
Terzi Sergio	University of Bergamo, Italy
Thoben Klaus-Dieter	BIBA - Bremer Institut für Produktion und Logistik, Germany
Tucci Mario	Università di Firenze, Italy
Uusitalo Teuvo	VTT Technical Research Centre of Finland, Finland
Vallespir Bruno	Bordeaux University, France
Vasyutynskyy Volodymyr	SAP Research Dresden, Germany
Villa Agostino	Politecnico di Torino, Italy
Wortmann J.C.	University of Groningen, The Netherlands
Zolotova Iveta	Technical University of Kosice, Slovakia

Table of Contents – Part I

Part I: Sustainability

Energy Efficient Manufacturing

Toward Energy Efficient Manufacturing: A Study on Practices and Viewpoint of the Industry	1
<i>Gökân May, Marco Taisch, Bojan Stahl, and Vahid Sadr</i>	
Energy Efficient Production through a Modified –Green–PPC and a Communication Framework for the Energy Supply Chain to Manage Energy Consumption and Information	9
<i>Ulrich Brandenburg, Sebastian Kropp, Jorge Sunyer, and Daniel Batalla-Navarro</i>	
Energy-Efficient Machining via Energy Data Integration	17
<i>Tao Peng, Xun Xu, and Juhani Heilala</i>	
An ICT Supported Holistic Approach for Qualitative and Quantitative Energy Efficiency Evaluation in Manufacturing Company	25
<i>Hendro Wicaksono, Kiril Aleksandrov, Sven Rogalski, and Jivka Ovtcharova</i>	
How Energy Recovery Can Reshape Storage Assignment in Automated Warehouses	33
<i>Antonella Meneghetti and Luca Monti</i>	
Modeling Green Fabs – A Queuing Theory Approach for Evaluating Energy Performance	41
<i>Hyun Woo Jeon and Vittaldas V. Prabhu</i>	
Analyzing Energy Consumption for Factory and Logistics Planning Processes	49
<i>Egon Müller, Hendrik Hopf, and Manuela Krones</i>	
Energy Implications in the Single-Vendor Single-Buyer Integrated Production Inventory Model	57
<i>Simone Zanoni, Laura Bettoni, and Christoph H. Glock</i>	
An Extended Energy Value Stream Approach Applied on the Electronics Industry	65
<i>Gerrit Bogdanski, Malte Schönemann, Sebastian Thiede, Stefan Andrew, and Christoph Herrmann</i>	

An Approach for Energy Saving in the Compound Feed Production	73
<i>Marc Allan Redecker and Klaus-Dieter Thoben</i>	
Bridging the Gap between Energy Management Systems and Machine Tools – Embedded Energy Efficiency in Production Planning and Control	80
<i>Manuel Rippel, Olga Willner, Johannes Plehn, and Paul Schönsleben</i>	
Energy Efficient Production Planning: A Joint Cognitive Systems Approach	88
<i>Connor Upton, Fergus Quilligan, Carlos García-Santiago, and Asier González-González</i>	
Using Internet of Things to Improve Eco-efficiency in Manufacturing: A Review on Available Knowledge and a Framework for IoT Adoption	96
<i>Giovanni Miragliotta and Fadi Shrouf</i>	
An Investigation into Minimising Total Energy Consumption, Total Energy Cost and Total Tardiness Based on a Rolling Blackout Policy in a Job Shop	103
<i>Ying Liu, Niels Lohse, Sanja Petrovic, and Nabil Gindy</i>	
Requirements Analysis and Definition for Eco-factories: The Case of EMC2	111
<i>Marco Taisch and Bojan Stahl</i>	
Energy Efficient Process Planning System – The ENEPLAN Project . . .	119
<i>Paolo Calefati, John Pandremenos, Apostolos Fysikopoulos, and George Chryssolouris</i>	
Energy Efficiency Optimisation in Heat Treatment Process Design	127
<i>Iñigo Mendikoa, Mikel Sorli, Alberto Armijo, Laura Garcia, Luis Erausquin, Mario Insunza, Jon Bilbao, Hakan Friden, Anders Björk, Linus Bergfors, Romualdas Skema, Robertas Alzbutas, and Tomas Iesmantas</i>	
Evaluation and Calculation of Dynamics in Environmental Impact Assessment	135
<i>Björn Johansson, Jon Andersson, Erik Lindskog, Jonatan Berglund, and Anders Skoogh</i>	
Discrete Part Manufacturing Energy Efficiency Improvements with Modelling and Simulation	142
<i>Juhani Heilala, Marja Paju, Jari Montonen, Reino Ruusu, Mikel Sorli, Alberto Armijo, Pablo Bermell-Garcia, Simon Astwood, and Santiago Quintana</i>	

A Parallelizable Heuristic for Solving the Generic Materials and Operations Planning in a Supply Chain Network: A Case Study from the Automotive Industry	151
<i>Julien Maheut and Jose Pedro Garcia-Sabater</i>	
Factory Modelling: Combining Energy Modelling for Buildings and Production Systems	158
<i>Peter D. Ball, Melanie Despeisse, Steve Evans, Rick M. Greenough, Steve B. Hope, Ruth Kerrigan, Andrew Levers, Peter Lunt, Vincent Murray, Mike R. Oates, Richard Quincey, Li Shao, Timothy Waltniel, and Andrew J. Wright</i>	
Sustainable Value Creation, Business Models and Strategies	
Business Modelling for Sustainable Manufacturing	166
<i>Maria Holgado, Donatella Corti, Marco Macchi, Padmakshi Rana, Samuel W. Short, and Steve Evans</i>	
Embedding Sustainability in Business Modelling through Multi-stakeholder Value Innovation	175
<i>Samuel W. Short, Padmakshi Rana, Nancy M.P. Bocken, and Steve Evans</i>	
Toward Sustainability Governance in Manufacturing Networks	184
<i>Teuvo Uusitalo, Markku Reunanen, Katri Valkokari, Pasi Valkokari, and Katariina Palomäki</i>	
Implementation of Sustainability in Ongoing Supply Chain Operations	192
<i>Liliyana Makarova Jørsfeldt, Peter Meulengracht Jensen, and Brian Vejrum Waehrens</i>	
Modular Framework for Reliable LCA-Based Indicators Supporting Supplier Selection within Complex Supply Chains	200
<i>Carlo Brondi, Rosanna Fornasiero, Manfredi Vale, Ludovico Vidali, and Federico Brugnoli</i>	
Sustainable Food Supply Chains: Towards a Framework for Waste Identification	208
<i>Lukas Chabada, Heidi Carin Dreyer, Anita Romsdal, and Daryl John Powell</i>	
A Classification of Industrial Symbiosis Networks: A Focus on Materials and Energy Recovery	216
<i>Vito Albino, Achille Claudio Garavelli, and Vincenzo Alessio Romano</i>	

Performance Evaluation in Sustainability Conscious Manufacturing Companies by Using TOPSIS Method 224
Merve Kılıç and Seren Öz Mehmet Taşan

A Decision-Aiding Approach for Residential PhotoVoltaic System Choice: An Application to the French Context 232
Fredy Huaylla, Lamia Berrah, and Vincent Cliville

Design of Controlling Supported Sustainability of Manufacturing Enterprises 240
Eryk Głodziński

Part II: Design, Manufacturing and Production Management

Mass Customization

Modularization – Enabler for Shop Floor Involvement in Improvement and Development 250
Bjørnar Henriksen, Lars Skjelstad, Eva Amdahl Seim, and Carl Christian Røstad

Comparison of Criticality of Configuration Choices for Market Price and Product Cost 262
Peter Nielsen and Thomas Ditlev Brunoe

The Multiple Faces of Mass Customization: Product Design, Process Design and Supply Chain Design 270
Nico J. Vandaele and Catherine J. Decouttere

Development of a Business Process Matrix for Structuring the Implications of Using Configurators in an Engineer-To-Order Environment 278
Olga Willner, Manuel Rippel, Matthias Wandfluh, and Paul Schönsleben

Designing Rotationally Symmetric Products for Multi-variant Mass Production by Using Production-Technical Solution Space 286
Günther Schuh, Till Potente, Christina Thomas, and Stephan Schmitz

Robotics in the Construction Industry: Mass Customization or Digital Crafting? 294
Ingrid Paoletti and Roberto Stefano Naboni

Simulation-Based Design of Production Networks for Manufacturing of Personalised Products	301
<i>Dimitris Mourtzis, Michalis Doukas, and Foivos Psarommatis</i>	
An Empirical Based Proposal for Mass Customization Business Model in Footwear Industry	310
<i>Golboo Pourabdollahian, Donatella Corti, Chiara Galbusera, and Julio Cesar Kostycz Silva</i>	
Mass Customized Large Scale Production System with Learning Curve Consideration	318
<i>KuoWei Chen and Richard Lee Storch</i>	
Event-Driven Order Rescheduling Model for Just-In-Sequence Deliveries to a Mixed-Model Assembly Line	326
<i>Georg Heinecke, Jonathan Köber, Raffaello Lepratti, Steffen Lamparter, and Andreas Kunz</i>	
Support to Order Management and Collaborative Production of Customised Garments for Specific Target Groups	334
<i>Eva Coscia, Michele Sesana, and Rosanna Fornasiero</i>	
Modeling and Simulation Tool for Sustainable MC Supply Chain Design and Assessment	342
<i>Paolo Pedrazzoli, Marino Alge, Andrea Bettoni, and Luca Canetta</i>	
Agent Based Resources Allocation in Job Shop with Re-entrant Features: A Benchmarking Analysis	350
<i>Matteo Mario Savino and Antonio Mazza</i>	

Products of the Future and Manufacturing Systems Design

Design of a Taxation System to Promote Electric Vehicles in Singapore	359
<i>Seng Tat Chua and Masaru Nakano</i>	
Knowledge Management in Set Based Lean Product Development Process	368
<i>Robert Furian, Frank von Lacroix, Dragan Stokic, Ana Correia, Cristina Grama, Stefan Faltus, Maksim Maksimovic, Karl-Heinrich Grote, and Christiane Beyer</i>	
Design of Fundamental Ontology for Manufacturing Product Lifecycle Applications	376
<i>Dimitris Kiritsis, Soumaya El Kadiri, Apostolos Perdikakis, Ana Milicic, Dimitris Alexandrou, and Kostas Pardalis</i>	

Proposal of an Assessment Model for New Product Development	383
<i>Monica Rossi, Sergio Terzi, and Marco Garetti</i>	
Multi-objective Optimization of Product Life-Cycle Costs and Environmental Impacts	391
<i>Daniele Cerri, Marco Taisch, and Sergio Terzi</i>	
A Stochastic Formulation of the Disassembly Line Balancing Problem	397
<i>Mohand Lounes Bentaha, Olga Battaia, and Alexandre Dolgui</i>	
Incorporating Regularity of Required Workload to the MMSP-W with Serial Workstations and Free Interruption of the Operations	405
<i>Joaquín Bautista, Rocío Alfaro, and Alberto Cano</i>	
Incorporating Ergonomics Factors into the TSALBP	413
<i>Joaquín Bautista, Cristina Batalla, and Rocío Alfaro</i>	
Critical Factors for Successful User-Supplier Integration in the Production System Design Process	421
<i>Jessica Bruch and Monica Bellgran</i>	

Advanced Design, Manufacturing and Production Management

Current State and Future Perspective Research on Lean Remanufacturing – Focusing on the Automotive Industry	429
<i>Elzbieta Pawlik, Winifred Ijomah, and Jonathan Corney</i>	
Understanding Product State Relations within Manufacturing Processes	437
<i>Benjamin Knoke, Thorsten Wuest, and Klaus-Dieter Thoben</i>	
Universal Simulation Model in Witness Software for Verification and Following Optimization of the Handling Equipment	445
<i>Jiří Holík and Lenka Landryová</i>	
An Adaptive Kanban and Production Capacity Control Mechanism	452
<i>Léo Le Pallec Marand, Yo Sakata, Daisuke Hirotsani, Katsumi Morikawa, and Katsuhiko Takahashi</i>	
Intelligent Manufacturing Systems: Controlling Elastic Springback in Bending	460
<i>Torgeir Welo</i>	

Splitting or Sharing Resources at the Process Level: An Automotive Industry Case Study	467
<i>Dag E. Gotteberg Haartveit, Marco Semini, and Erlend Alfnes</i>	
Optimization of Flexible Assembly Systems for Electrical Motors	474
<i>Mirlind Bruqi, Ramë Likaj, and Jorgaq Kaqani</i>	
Flexible and Reconfigurable Layouts in Complex Manufacturing Systems	484
<i>Maria Manuela Azevedo, José António Crispim, and Jorge Pinho de Sousa</i>	
Cost Management Practices in Collaborative Product Development Processes	494
<i>Carlos Barbosa, Paulo Afonso, and Manuel Nunes</i>	
The Multidisciplinary Virtual Product Development Integrates the Influence of Die Casting Defects in the Mechanical Response	502
<i>Nicola Gramegna, Iñigo Loizaga, Susana Berrocal, Franco Bonollo, Giulio Timelli, and Stefano Ferraro</i>	
Design and Simulation-Based Testing of a Prediction Market System Using SIPS for Demand Forecasting	510
<i>Hajime Mizuyama</i>	

Robotics in Manufacturing

Multi-objective Genetic Algorithm for Real-World Mobile Robot Scheduling Problem	518
<i>Quang-Vinh Dang, Izabela Nielsen, and Kenn Steger-Jensen</i>	
Multi-camera 3D Object Reconstruction for Industrial Automation	526
<i>Malamati Bitzidou, Dimitrios Chrysostomou, and Antonios Gasteratos</i>	
Multimodal Processes Rescheduling	534
<i>Grzegorz Bocewicz, Zbigniew A. Banaszak, Peter Nielsen, and Quang-Vinh Dang</i>	
Novel Automated Production System for the Footwear Industry	542
<i>Silvio Cocuzza, Rosanna Fornasiero, and Stefano Debei</i>	
Safety-Guided Design Concerning Standardization's Requirements of Mowing Robots	550
<i>Spyridon G. Mouroutsos and Eleftheria Mitka</i>	

Part III: Human Factors, Learning and Innovation**Modern Learning in Manufacturing and Production Systems**

Applying Serious Games in Lean Manufacturing Training	558
<i>Mourad Messaadia, Ahmed Bufardi, Julien Le Duigou, Hadrien Szigeti, Benoit Eynard, and Dimitris Kiritsis</i>	
Flow and Physical Objects in Experiential Learning for Industrial Engineering Education	566
<i>David Jentsch, Ralph Riedel, and Egon Mueller</i>	
Context Aware E-Support in E-Maintenance	574
<i>Nikos Papathanassiou, Christos Emmanouilidis, Petros Pistofidis, and Dimitris Karampatzakis</i>	
Using Behavioral Indicators to Assess Competences in a Sustainable Manufacturing Learning Scenario	582
<i>Heiko Duin, Gregor Cerinsek, Manuel Oliveira, Michael Bedek, and Slavko Dolinsek</i>	
Lean Product Development: Serious Game and Evaluation of the Learning Outcomes	590
<i>Endris Kerga, Armin Akaberi, Marco Taisch, Monica Rossi, and Sergio Terzi</i>	
Learning PLM System with a Serious Game	598
<i>Philippe Pernelle, Stephane Talbot, Thibault Carron, and Jean-Charles Marty</i>	
Beware of the Robot: A Highly Interactive and Immersive Virtual Reality Training Application in Robotic Manufacturing Systems	606
<i>Elias Matsas, Dimitrios Batras, and George-Christopher Vosniakos</i>	
Educational Framework of Product Lifecycle Management Issues for Master and PhD Study Programmes	614
<i>Milan Edl</i>	
The Use of Serious Games in the Education of Engineers	622
<i>Jannicke Madeleine Baalsrud Hauge, Borzoo Pourabdollahian, and Johann C.K.H. Riedel</i>	
Integrating Competence Management into a Coupled Project-System Design Management	630
<i>Arz Wehbe, Christophe Merlo, and Véronique Pilnière</i>	

Model of Skills Development at the Operational Level Applied to the Steel Industry	638
<i>Ulysses Martins Moreira Filho and Pedro Luiz de Oliveira Costa Neto</i>	

Human Factors, Quality and Knowledge Management

Success Factors for PDCA as Continuous Improvement Method in Product Development	645
<i>Eirin Lodgaard, Inger Gamme, and Knut Einar Aasland</i>	

Supporting Production System Development through the Obeya Concept	653
<i>Siavash Javadi, Sasha Shahbazi, and Mats Jackson</i>	

Measurement, Classification and Evaluation of the Innovation Process and the Identification of Indicators in Relation to the Performance Assessment of Company's Innovation Zones	661
<i>Peter Kubičko, Lenka Landryová, Roman Mihal', and Iveta Zolotová</i>	

The Internet of Experiences –Towards an Experience-Centred Innovation Approach	669
<i>Stefan Wellsandt, Thorsten Wuest, Christopher Durugbo, and Klaus-Dieter Thoben</i>	

Innovating a Business Model for Services with Storytelling	677
<i>Morten Lund</i>	

Business Strategy and Innovativeness: Results from an Empirical Study	685
<i>Gündüz Ulusoy, Gürhan Günday, Kemal Kılıç, and Lütüfihak Alpkan</i>	

International R&D and Manufacturing Networks: Dynamism, Structure and Absorptive Capacity	693
<i>Patricia Deflorin, Maike Scherrer-Rathje, and Helmut Dietl</i>	

Innovation in Products and Services in Developing Countries

Building a Conceptual Model for Analyzing Sustainability Projects Aiming at Technology Transfer: A Terminological Approach	701
<i>Deise Rocha Martins dos Santos Oliveira, Irenilza de Alencar Nääs, Ivo Pierozzi Júnior, and Oduvaldo Vendrametto</i>	

Finding Optimal Resources for IT Services	708
<i>Sumit Raut and Muralidharan Somasundaram</i>	

Development of Engineering Competencies in Brazil and Innovation Policies, an Overview of the Automotive Sector	716
<i>Renato Perrotta and Oduvaldo Vendrametto</i>	
Holistic Vision of Sustainability in the Production Chain in Oil Exploration Pre-Salt Layer	724
<i>Alessandro Luiz da Silva, Mônica Franchi Carniello, and José Luís Gomes da Silva</i>	
Applicability of Risk Process in Software Projects in Accordance with ISO 31.000:2009	734
<i>Marcelo Nogueira and Ricardo J. Machado</i>	
Author Index	743

Table of Contents – Part II

Part IV: ICT and Emerging Technologies in Production Management

Emerging Technologies in Production and the Lifecycle Management of Products and Assets

Analysis of Manufacturing Process Sequences, Using Machine Learning on Intermediate Product States (as Process Proxy Data)	1
<i>Thorsten Wuest, Christopher Irgens, and Klaus-Dieter Thoben</i>	
Improving Tree-Based Classification Rules Using a Particle Swarm Optimization	9
<i>Chi-Hyuck Jun, Yun-Ju Cho, and Hyeseon Lee</i>	
Profiling Context Awareness in Mobile and Cloud Based Engineering Asset Management	17
<i>Petros Pistofidis and Christos Emmanouilidis</i>	
Seamless Access to Sensor Networks for Enhanced Manufacturing Processes	25
<i>Kostas Kalaboukas, Borislav Jerabek, Rok Lah, and Freek van Polen</i>	
Wireless Sensor Network Technologies for Condition Monitoring of Industrial Assets	33
<i>Spilios Giannoulis, Christos Koulamas, Christos Emmanouilidis, Petros Pistofidis, and Dimitris Karampatzakis</i>	
A Critical Evaluation of RFID in Manufacturing	41
<i>Wei Zhou and Selwyn Piramuthu</i>	
Semantic Data Model for Operation and Maintenance of the Engineering Asset	49
<i>Andreas Koukias, Dražen Nadoveza, and Dimitris Kiritsis</i>	

Enterprise Integration and Interoperability

Towards Changeable Production Systems – Integration of the Internal and External Flow of Information as an Enabler for Real-Time Production Planning and Controlling	56
<i>Volker Stich, Niklas Hering, Stefan Kompa, and Ulrich Brandenburg</i>	

Integrated Model-Based Manufacturing for Rapid Product and Process Development	64
<i>Vesna Mandic, Radomir Radisa, Vladan Lukovic, and Milan Curcic</i>	
Real-Time Production Monitoring in Large Heterogeneous Environments	72
<i>Arne Schramm, Bernhard Wolf, Raik Hartung, and André Preußner</i>	
Ontology-Based Flexible Multi Agent Systems Design and Deployment for Vertical Enterprise Integration	80
<i>Christos Alexakos, Manos Georgoudakis, Athanasios P. Kalogeras, and Spiridon L. Likothanassis</i>	
MANU Building – Bringing together Manufacturing Automation and Building Automation	88
<i>Aleksey Bratukhin, Albert Treytl, and Thilo Sauter</i>	
Formal Specification of Batch Scheduling Problems: A Step toward Integration and Benchmarking	96
<i>Gabriela Patricia Henning</i>	

ICT for Manufacturing, Services and Production Management

Introducing "2.0" Functionalities in an ERP	104
<i>Bernard Grabot, Raymond Houé, Fabien Lauroua, and Anne Mayère</i>	
Designing and Implementing a Web Platform to Support SMEs in Collaborative Product Development	112
<i>Marco Formentini, Michela Lolli, and Alberto Felice De Toni</i>	
Exploring the Impact of ICT in CPFR: A Case Study of an APS System in a Norwegian Pharmacy Supply Chain	120
<i>Maria Kollberg Thomassen, Heidi Dreyer, and Patrik Jonsson</i>	
MES Support for Lean Production	128
<i>Daryl Powell, Andreas Binder, and Emrah Arica</i>	
Handling Unexpected Events in Production Activity Control Systems	136
<i>Emrah Arica, Jan Ola Strandhagen, and Hans-Henrik Hvolby</i>	
Analyzing IT Supported Production Control by Relating Petri Nets and UML Static Structure Diagrams	144
<i>Henk Jan Pels</i>	

Enabling Information Sharing in a Port	152
<i>Peter Bjerg Olesen, Hans-Henrik Hvolby, and Iskra Dukovska-Popovska</i>	

Designing a Lifecycle Integrated Data Network for Remanufacturing Using RFID Technology	160
<i>Young-woo Kim and Jinwoo Park</i>	

Part V: Product and Asset Lifecycle Management

Product Lifecycle Management

Implementing Sustainable Supply Chain in PLM	168
<i>Maria Bonvehí Rosich, Julien Le Duigou, and Magali Bosch-Mauchand</i>	

Full Exploitation of Product Lifecycle Management by Integrating Static and Dynamic Viewpoints	176
<i>Dario Antonelli, Giulia Bruno, Antonia Schwichtenberg, and Agostino Villa</i>	

Enterprise Information Systems' Interoperability: Focus on PLM Challenges	184
<i>Dorsaf Elheni-Daldoul, Julien Le Duigou, Benoit Eynard, and Sonia Hajri-Gabouj</i>	

Closed-Loop Life Cycle Management Concept for Lightweight Solutions	192
<i>Fatih Karakoyun and Dimitris Kiritsis</i>	

Design Support Based onto Knowledge to Increase Product Reliability and Allow Optimized Abacus Development	200
<i>Jérémy Boxberger, Daniel Schlegel, Nahdir Lebaal, and Samuel Gomes</i>	

Towards an Harmonious and Integrated Management Approach for Lifecycle Planning	208
<i>Frédéric Demoly, Samuel Deniaud, and Samuel Gomes</i>	

An MDA Approach for PLM System Design	216
<i>Onur Yildiz, Lilia Gzara, Philippe Pernelle, and Michel Tollenaere</i>	

Asset Lifecycle Management

Dynamic Alarm Management in Next Generation Process Control Systems	224
<i>Eva Jerhotova, Marek Sikora, and Petr Stluka</i>	

Sustainable Layout Planning Requirements by Integration of Discrete Event Simulation Analysis (DES) with Life Cycle Assessment (LCA) . . . 232
Victor Emmanuel de Oliveira Gomes, Durval Joao De Barba Jr, Jefferson de Oliveira Gomes, Karl-Heinrich Grote, and Christiane Beyer

Equipment’s Prognostics Using Logical Analysis of Data 240
Alireza Ghasemi, Sasan Esmaeili, and Soumaya Yacout

Designing an Optimal Shape Warehouse 248
Lucio Compagno, Diego D’Urso, and Natalia Trapani

A Fourth Party Energy Provider for the Construction Value Chain: Identifying Needs and Establishing Requirements 256
Sergio Cavalieri, Stefano Ierace, Nicola Pedrali, and Roberto Pinto

Performance and Risk Management

Performance Measurement Systems for Craft-Oriented Small Enterprises 265
Inger Gamme, Eva Amdahl Seim, and Eirin Lodgaard

State-of-the-Art Review on Operational Resilience: Concept, Scope and Gaps 273
Seyoum Eshetu Birkie, Paolo Trucco, and Matti Kaulio

Modeling and Presentation of Interdependencies between Key Performance Indicators for Visual Analysis Support 281
Stefan Hesse, Volodymyr Vasyutynskyy, Martin Rosjat, and Christian Hengstler

Reference Model Concept for Structuring and Representing Performance Indicators in Manufacturing 289
Stefan Hesse, Bernhard Wolf, Martin Rosjat, Dražen Nadoveza, and George Pintzos

Productivity Measurement and Improvements: A Theoretical Model and Applications from the Manufacturing Industry 297
Peter Almström

Part VI: Services, Supply Chains and Operations

Services

Manufacturing Service Ecosystems: Towards a New Model to Support Service Innovation Based on Extended Products	305
<i>Stefan Wiesner, Ingo Westphal, Manuel Hirsch, and Klaus-Dieter Thoben</i>	
Multiagent System-Based Simulation Method of Service Diffusion in Consumer Networks – Application to Repeatedly Purchased Plural Services –	313
<i>Nobutada Fujii, Toshiya Kaihara, and Tomoya Yoshikawa</i>	
Manufacturing Service Innovation Ecosystem	321
<i>Marco Taisch, Mohammadreza Heydari Alamdari, and Christiano Zanetti</i>	
Improvement Method of Service Productivity for Taxi Company	329
<i>Takashi Tanizaki</i>	
The Servitization of Manufacturing: A Methodology for the Development of After-Sales Services	337
<i>Ottar Bakås, Daryl Powell, Barbara Resta, and Paolo Gaiardelli</i>	
Do Consumers Select Food Products Based on Carbon Dioxide Emissions?	345
<i>Keiko Aoki and Kenju Akai</i>	
A Choice Experiment for Air Travel Services	353
<i>Kenju Akai, Keiko Aoki, and Nariaki Nishino</i>	
Product-Service Systems Modelling and Simulation as a Strategic Diagnosis Tool	361
<i>Thècle Alix and Gregory Zacharewicz</i>	
Contribution to the Development of a Conceptual Model of Service and Service Delivery	369
<i>Wael Touzi, Thècle Alix, and Bruno Vallespir</i>	
PSS Production Systems: A Simulation Approach for Change Management	377
<i>Guillaume Marquès, Malik Chalal, and Xavier Boucher</i>	
Improving Customer’s Subjective Waiting Time Introducing Digital Signage	385
<i>Takeshi Shimamura, Toshiya Kaihara, Nobutada Fujii, and Takeshi Takenaka</i>	

Framework for Lean Management in Industrial Services	392
<i>Günther Schuh and Philipp Stüer</i>	
The Role of IT for Extended Products' Evolution into Product Service Ecosystems	399
<i>Klaus-Dieter Thoben and J.C. (Hans) Wortmann</i>	
Demand Control Loops for a Global Spare Parts Management	407
<i>Uwe Dombrowski, Sebastian Weckenborg, and Michael Mederer</i>	
The Value and Management Practices of Installed Base Information in Product-Service Systems	415
<i>Nicola Saccani, Andrea Alghisi, and Jukka Borgman</i>	
Reference Decision Models in the Medico-social Service Sector	422
<i>Henri Kromm and Yves Ducq</i>	
Service Model for the Service Configuration	430
<i>Jose Angel Lakunza, Juan Carlos Astiazaran, and Maria Elejoste</i>	

Managing International Operations

Benefits and Risks in Dynamic Manufacturing Networks	438
<i>Ourania Markaki, Panagiotis Kokkinakos, Dimitrios Panopoulos, Sotirios Koussouris, and Dimitrios Askounis</i>	
Dynamic Manufacturing Networks Monitoring and Governance	446
<i>Panagiotis Kokkinakos, Ourania Markaki, Dimitrios Panopoulos, Sotirios Koussouris, and Dimitrios Askounis</i>	
The Insignificant Role of National Culture in Global Lean Programmes	454
<i>Torbjørn H. Netland, Miguel Mediavilla, and Ander Errasti</i>	
Methodology to Identify SMEs Needs of Internationalised and Collaborative Networks	463
<i>Beatriz Andrés and Raúl Poler</i>	
Framework for Improving the Design and Configuration Process of Global Operations	471
<i>S. Martínez, A. Errasti, J. Santos, and M. Mediavilla</i>	
What to Offshore, What to Produce at Home? A Methodology	479
<i>Marco Semini, Børge Sjøbakk, and Erlend Alfnes</i>	
Idiosyncratic Behavior of Globally Distributed Manufacturing	487
<i>Stanislaw Strzelczak</i>	

Improving the Industrialization of a New Product in an International Production Network: A Case Study from the Machinery Industry	495
<i>Donatella Corti and Saransh Choudhury</i>	
Optimize Resource Utilization at Multi-site Facilities with Agent Technology	503
<i>M.K. Lim and H.K. Chan</i>	
Proposing an Environmental Excellence Self-Assessment Model	511
<i>Peter Meulengracht Jensen, John Johansen, Brian Vejrum Waehrens, and Md. Shewan-Ul-Alam</i>	

Supply Networks and Supply Chain Management

Method for Quality Appraisal in Supply Networks	519
<i>João Gilberto Mendes dos Reis and Pedro Luiz de Oliveira Costa Neto</i>	
Chinese SMEs' Sourcing Practices and Their Impact on Western Suppliers	527
<i>Matthias Wandfluh, Christian Schneider, and Paul Schönsleben</i>	
Game Theory Based Multi-attribute Negotiation between MA and MSAs	535
<i>Fang Yu, Toshiya Kaihara, and Nobutada Fujii</i>	
Supplier Selection Criteria in Fractal Supply Network	544
<i>Sameh M. Saad, Julian C. Aririguzo, and Terrence D. Perera</i>	
A Test-Bed System for Supply Chain Management Incorporating Reverse Logistic	552
<i>Shigeki Umeda</i>	
A Dyadic Study of Control in Buyer-Supplier Relationships	560
<i>Anna Aminoff and Kari Tanskanen</i>	
A Fuzzy Decision Support System for Drawing Directions from Purchasing Portfolio Models	568
<i>Davide Aloini, Riccardo Dulmin, and Valeria Mininno</i>	
A Mixed-Integer Linear Programming Model for Transportation Planning in the Full Truck Load Strategy to Supply Products with Unbalanced Demand in the Just in Time Context: A Case Study	576
<i>Julien Maheut and Jose Pedro Garcia-Sabater</i>	
Improving the Application of Financial Measures in Supply Chain Management	584
<i>Felix Friemann, Matthias Wandfluh, Paul Schönsleben, and Robert Alard</i>	

Total Cost of Ownership for Supply Chain Management: A Case Study
in an OEM of the Automotive Industry 592
Paulo Afonso

Greening Manufacturing Supply Chains – Introducing Bio-based
Products into Manufacturing Supply Chains 600
David Sparling, Fred Pries, and Erin Cheney

Opportunistic and Dynamic Reconfiguration of Vehicle Routing
Problem Controlled by the Intelligent Product 608
*Rodrigue Tchapnga Takoudjou, Jean-Christophe Deschamps, and
Rémy Dupas*

Production Management, Operations and Logistics

Tactical and Operational Issues in a Hybrid MTO-MTS Production
Environment: The Case of Food Production 614
*Anita Romsdal, Emrah Arica, Jan Ola Strandhagen, and
Heidi Carin Dreyer*

A Note on the Simple Exponential Smooth Non-optimal Predictor, the
Order-up-to Policy and How to Set a Proper Bullwhip Effect 622
Erland Hejn Nielsen

One-of-a-Kind Production (OKP) Planning and Control: An Empirical
Framework for the Special Purpose Machines Industry 630
*Federico Adrodegari, Andrea Bacchetti, Alessandro Sicco,
Fabiana Pirola, and Roberto Pinto*

A Basic Study on Highly Distributed Production Scheduling 638
Eiji Morinaga, Eiji Arai, and Hidefumi Wakamatsu

A Design of Experiments Approach to Investigating the Sensitivity of
the Re-order Point Method 646
*Peter Nielsen, Giovanni Davoli, Izabela Nielsen, and
Niels Gorm Malý Rytter*

Challenges of Measuring Revenue, Margin and Yield Optimization in
Container Shipping 654
Albert Gardoń, Peter Nielsen, and Niels Gorm Malý Rytter

Improving Port Terminal Operations through Information Sharing 662
*Peter Bjerg Olesen, Iskra Dukowska-Popovska, and
Hans-Henrik Hvolby*

Perishable Inventory Challenges 670
*Cecilie M. Damgaard, Vivi T. Nguyen, Hans-Henrik Hvolby, and
Kenn Steger-Jensen*

Assessing the Impact of Management Concerns in E-business Requirements Planning in Manufacturing Organizations.....	678
<i>John Dilworth and Ashok Kochhar</i>	
Supporting the Design of a Management Accounting System of a Company Operating in the Gas Industry with Business Process Modeling	686
<i>Nikolaos A. Panayiotou and Ilias P. Tatsiopoulos</i>	
Base Stock Inventory Systems with Compound Poisson Demand: Case of Partial Lost Sales	693
<i>M. Zied Babai, Ziad Jemai, and Yves Dallery</i>	
A Concept for Project Manufacturing Planning and Control for Engineer-to-Order Companies	699
<i>Pavan Kumar Sriram, Erlend Alfnes, and Emrah Arica</i>	
Practical Considerations about Error Analysis for Discrete Event Simulations Model	707
<i>Giovanni Davoli, Peter Nielsen, Gabriele Pattarozzi, and Riccardo Melloni</i>	
Author Index	715