# Contents

## Part I  General Track 1: Sustainable Design, Innovation and Services

<table>
<thead>
<tr>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>A New CAD Integrated Application to Support Designers and Increase Design Sustainability</td>
<td>3</td>
</tr>
<tr>
<td>Giampaolo Campana, Mattia Mele and Barbara Cimatti</td>
<td></td>
</tr>
<tr>
<td>A Conflict Analysis and Resolution Method Based on Integrating the Extension and TRIZ Methods</td>
<td>15</td>
</tr>
<tr>
<td>Zhao Yanwei, Lou Jiongjiong, Ren Shedong, He Lu and Gui Fangzhi</td>
<td></td>
</tr>
<tr>
<td>Investigating the Regulatory-Push of Eco-innovations in Brazilian Companies</td>
<td>27</td>
</tr>
<tr>
<td>Paulo Savaget and Flavia Carvalho</td>
<td></td>
</tr>
<tr>
<td>Evolutive Scenarios for a New Concept of Sustainable Mobility</td>
<td>39</td>
</tr>
<tr>
<td>Patrizia Ranzo, Chiara Scarpitti and Rosanna Veneziano</td>
<td></td>
</tr>
<tr>
<td>Implications of Open Source Design for Sustainability</td>
<td>49</td>
</tr>
<tr>
<td>Jéremy Bonvoisin</td>
<td></td>
</tr>
<tr>
<td>Sustainable Supply Chain Management in a Circular Economy—Towards Supply Circles</td>
<td>61</td>
</tr>
<tr>
<td>Anna Aminoff and Outi Kettunen</td>
<td></td>
</tr>
<tr>
<td>How Does Sustainability Help or Hinder Innovation?</td>
<td>73</td>
</tr>
<tr>
<td>Vivian Tunn and Elies Dekoninck</td>
<td></td>
</tr>
<tr>
<td>A New Sustainable Product Development Model in Apparel Based on 3D Technologies for Virtual Proper Fit</td>
<td>85</td>
</tr>
<tr>
<td>Evridiki Papahristou and Nikolaos Bilalis</td>
<td></td>
</tr>
</tbody>
</table>
Part II General Track 2: Sustainable Manufacturing Processes and Technologies

Generic Approach to Sustainability Improvements in Manufacturing Ovens .................................................. 99
Frederick Pask, Peter Lake, Aidong Yang, Hella Tokos and Jhuma Sadhukhan

Corrado Grassi, Achim Schröter, Yves-Simon Gloy and Thomas Gries

Modelling and Verification of Energy Consumption in CNC Milling. ...................................................... 123
A. Shokrani, V. Dhokia and S.T. Newman

Optimal Cutting Parameters to Reduce Power Consumption in Face Milling of a Cast Iron Alloy for Environmental Sustainability .......................................................... 135
Xiaona Luan, Song Zhang and Gaoli Cai

Innovative Active Cross-Linking Agents for Sustainable Leather Manufacturing ........................................ 149
V. Beghetto, L. Agostinis, R. Taffarello and R. Samiolo

An Approach to Electricity Monitoring and Targeting (M&T) in Irish Precision Engineering SMEs .................. 157
John Cosgrove, Frank Doyle, Frances Hardiman and Gerard O’Farrell

Exploring the Scope of Industrial Symbiosis: Implications for Practitioners ............................................. 169
Maria Holgado, Dai Morgan and Steve Evans

Towards Reverse Logistics Archetypes to Stimulate Manufacturers’ Usage of End of Life and End of Use Products. .............................................................. 179
Serhan Alshammari and Peter Ball

Part III General Track 3: Sustainable Manufacturing Systems and Enterprises

Sustainable Manufacturing Systems Based on Demand Forecasting—Supply Chain Sustainable Growth ........... 191
Martin Hart, Pavel Taraba and Jiří Konečný
Contents ix

An Analysis of Indirect Water Withdrawal and Consumption in Automotive Manufacturing Facilities .......................... 203
Bert Bras and Andrew Carlile

How are Micro Enterprises Adopting Emergent Technologies? ......... 215
Peter Dorrington, Franck Lacan and Samuel Bigot

Improving Performance of Eco-Industrial Parks ................... 227
Bert Bras, Astrid Layton and Marc Weissburg

Product Change Management and Future Information Architectures ................................................. 241
Ashley Morris, Rossi Setchi and Paul Prickett

Road-Mapping Towards a Sustainable Lower Energy Foundry ........ 251
Hamid Mehrabi, Mark Jolly and Konstantinos Salonitis

Increasing Production Efficiency Through Electronic Batch Record Systems: A Case Study ......................... 261
Jacqueline L. Marsh and Daniel R. Eyers

A Method for Understanding Sustainable Design Trade-Offs During the Early Design Phase ........................................ 271
Addison Wisthoff and Bryony DuPont

Achieving Sustainability in SME Manufacturing Operations via the Use of Flexible Integrated Technology and Product Symbiosis ......................................................... 281
Alan Davies, Michael Packianather, John White
and Sajith Soman

Part IV General Track 4: Decision Support and Sustainability

Business Model Experimentation for Sustainability .................. 297
Nancy M.P. Bocken, Ilka Weissbrod and Mike Tennant

Design of Indicators for Measuring Product Performance in the Circular Economy ..................................... 307
Percy Griffiths and Steve Cayzer

An Integrated Product Development Approach to Improving Sustainability Using Simulated Experiments: Manufacturing Case Study ....................................................... 323
Joseph Axiak, Paul Refalo and Emmanuel Francalanza

Life Cycle Assessment and Life Cycle Costing as Supporting Tools for EVs Lightweight Design ......................... 335
Laura Zanchi, Massimo Delogu, Marcos Ierides
and Harilaos Vasiliadis
The Characteristic Objects Method: A New Intelligent Decision Support Tool for Sustainable Manufacturing .......................... 349
Jarosław Wątrobiski and Wojciech Sałabun

Green Supplier Selection Framework Based on Multi-Criteria Decision-Analysis Approach ........................................... 361
Jarosław Wątrobiski and Wojciech Sałabun

Part V Invited Session 1: Design for Additive Manufacture

Application of Sustainable Design in Additive Manufacturing of an Unmanned Aerial Vehicle ................................. 375
Stefan Junk and Werner Schröder

Evaluating Innovative CAD Techniques in the Creation of Conformal Cellular Structures ........................................... 387
Shwe Soe, Wassim Jabi and Peter Theobald

An Investigation into the Quasi-Static Response of Ti6Al4V Lattice Structures Manufactured Using Selective Laser Melting .... 399
Qixiang Feng, Qian Tang, Shwe Soe, Ying Liu and Rossi Setchi

A Bottom-up Design Framework for CAD Tools to Support Design for Additive Manufacturing ................................. 411
Steven Goguelin, Joseph Michael Flynn and Vimal Dhokia

A Surface Modification Decision Tree to Influence Design in Additive Manufacturing .................................................. 423
Eleanor Rose Gordon, Alborz Shokrani, Joseph Michael Flynn, Steven Goguelin, Jack Barclay and Vimal Dhokia

Additive Manufacturing Simulation Using Signed Distance Fields ........ 435
Jack Barclay, Vimal Dhokia and Aydin Nassehi

Part VI Invited Session 2: Sustainability and Resilience in Agri-food Supply Chains

Agri-food Supply Chain for Mitigation of Volatilities in the Role of Intermediary: A Case Study of a Mushroom Trading Company in Taiwan ............................................................... 447
Tzu-Yen Huang and Luisa Huaccho Huatuco

Exploring Dynamic Natural-Resource-Based Capabilities for Sustainable Agri-food Chains ........................................... 455
Natalie McDougall, Beverly Wagner and Jillian MacBryde

Supplier Selection Processes: A Case Study in a Chinese Dairy Company ................................................................. 467
Xuanyi Ren and Luisa Huaccho Huatuco
Supply Chain Risk Management Identification and Mitigation: A Case Study in a Chinese Dairy Company ...................... 475
Canglong Yu and Luisa Huaccho Huatuco

Future Prospects of Sustainable Aquaculture Supply Chain Practices ......................................................... 487
G. Malindretos, I. Vlachos, I. Manikas and M. Chatzimanolakis

Part VII Invited Session 3: Eco-design Through Systematic Innovation

QFD for a SME Network of the Wood Sector to Improve Competitiveness and Sustainability .......................... 501
Gilda Massa and Nicola Gessa

Using TRIZ to Combine Advantages of Different Concepts in an Eco-Design Process ........................................ 513
Pierre-Emmanuel Fayemi, Claire Vitoux, Malte Schöfer and Giacomo Bersano

Is TRIZ an Ecodesign Method? .................................................. 525
D. Russo, M. Serafini and C. Rizzi

An Integrated Eco-Design Decision Making Tool ...................... 537
Awanis Romli, Paul Prickett, Rossitza Setchi and Shwe Soe

A Bridge Between CAD and LCA to Optimise the Life Cycle Inventory Phase .............................................. 549
Marco Mengarelli, Sara Cortesi, Patrizia Buttol, Marco Marconi and Francesca Reale

Part VIII Invited Session 4: Redistributed Manufacturing for Resilience and Sustainability

Can Re-distributed Manufacturing and Digital Intelligence Enable a Regenerative Economy? An Integrative Literature Review ................................................................. 563
Mariale Moreno and Fiona Charnley

Makespaces: From Redistributed Manufacturing to a Circular Economy .................................................. 577
Sharon Prendeville, Grit Hartung, Erica Purvis, Clare Brass and Ashley Hall

An Exploratory Study of the Resilience of Manufacturing in the Cardiff Capital Region .................................. 589
Anthony Soroka, Mohamed Naim, Gillian Bristow and Laura Purvis
Design of an Integrated Assessment of Re-distributed Manufacturing for the Sustainable, Resilient City
Rachel Freeman, Chris McMahon and Patrick Godfrey

The Local Nexus Network: Exploring the Future of Localised Food Systems and Associated Energy and Water Supply
Julian Cottee, Alma López-Avilés, Kourosh Behzadian, David Bradley, David Butler, Clare Downing, Raziyeh Farmani, John Ingram, Matthew Leach, Andy Pike, Lisa De Propris, Laura Purvis, Pamela Robinson and Aidong Yang

Part IX Invited Session 5: UK-China Forum on Innovation for Green Manufacturing
Application of Multilevel Maturity in Collaborative Development Mode of Aircraft
Yao Huang, Qian Tang, Rui Chen and Shilong Wang

A Social Sustainability Assessment Model for Manufacturing Systems Based on Ergonomics and Fuzzy Inference System
Yang Cao, Shilong Wang, Lili Yi and Jie Zhou

Cloud Manufacturing Service-Oriented Platform for Group Enterprises
Ling Kang, Shilong Wang and Changsong Li

Mathematical Model of Multi-source Energy Flows for CNC Worm Wheel Grinding Machine Tools
Liu Pengxiang, Li Guolong and Cao Huajun

Fault Status Assessment for Fault Diagnosis of a Multistage Planetary Gear Set Based on Dynamic Simulation and Experimental Analysis
Guoyan Li, Fangyi Li, Dehao Dong, Jianfeng Li, Haohua Liu and Yifan Wang

Author Index

Contents
Sustainable Design and Manufacturing 2016
Setchi, R.; Howlett, R.J.; Liu, Y.; Theobald, P. (Eds.)
2016, XII, 689 p. 221 illus., 72 illus. in color., Hardcover
ISBN: 978-3-319-32096-0