

Contents

PART I: VISION AND FUTURE PRESPECTIVES	1
Change in Manufacturing – Research and Industrial Challenges	2
<i>H. ElMaraghy, T. AlGeddawy, A. Azab, W. ElMaraghy</i>	
Adaptive Job Control in the Cognitive Factory	10
<i>M. F. Zaeh, M. Ostgathe, F. Geiger, G. Reinhart</i>	
Mass Customisation as a Competitive Factor for Sustainability.....	18
<i>A. Bernard, J. Daaboul, F. Laroche, C. Da Cunha</i>	
PART II: MANUFACTURING SYSTEMS.....	27
MANUFACTURING SYSTEM DESIGN, PLANNING, OPERATION, AND CONTROL.....	28
Linnaean and Cladistic Classifications of Manufacturing Systems	29
<i>J. S. Baldwin, C. Rose-Anderssen, K. Ridgway</i>	
Integrating Ability Limitations into Assembly System Design	35
<i>G. Reinhart, J. Egbers</i>	
Selection Catalogue of Kinematic Configuration for Pick and Place Application	41
<i>K. Chandrasekaran, A. Djuric, W. H. ElMaraghy</i>	
A Transition in Production and Planning for a Changeable Micro Manufacturing System	47
<i>B. Röhlig, J. P. Wulfsberg</i>	
Using formal methods to model hybrid manufacturing processes	52
<i>Aydin Nassehi, Stephen Newman, Vimal Dhokia, Zicheng Zhu, Reza Imani Asrai</i>	
Considering Reconfigurability Characteristics in Production System Design	57
<i>Carin Rösiö</i>	
Ontology-driven Requirements Elicitation in Product Configuration Systems.....	63
<i>Wicaksono, H.; Schubert, V.; Rogalski, S.; Ait Laydi, Y.; Ovtcharova, J.</i>	
Early Alert Cockpits for Changeable Manufacturing Systems	68
<i>Spath, D.; Gerlach, S.; Scholtz, O.; Hämmerle, M.; Krause, T.</i>	
New Methods to Create Variants of 3-D Simulation Models of Manufacturing Systems	74
<i>R. Wischnewski, J. Rossmann, O. Stern</i>	
Product variety, flexibility and energy use in hot rolling mills	80
<i>J. Storck</i>	
Lost Value Mapping – A Fast Method to Track Lost Value in a Production Flow	86
<i>Pawel Pawlewski, Zbigniew J. Pasek</i>	
CHANGEABILITY, FLEXIBILITY, RE-CONFIGURABILITY AND THEIR METRICS	92
A survey on changeability of machine tools.....	93
<i>Philip Hollstein; Heiner Lasi; Hans-Georg Kemper</i>	
Quantifying the Effect of Enterprise Strategic Flexibility.....	99
<i>A. Arafa, W.H. ElMaraghy</i>	
Decision Making During Design and Reconfiguration of Modular Assembly Lines	105
<i>K. Tracht, S. Hogueve</i>	
Development of manufacturing process chains considering uncertainty	111
<i>S.O. Schmitt, J. Avemann, P. Groche</i>	
Optimal Sequencing of Machining Operations for Changeable Manufacturing	117
<i>Ahmed Azab, Attia H. Gomaa</i>	
Manufacturing Concepts of the Future – Upcoming Technologies Solving Upcoming Challenges.....	123
<i>R. Hadar, A. Bilberg</i>	

Analysis of Reconfigurable 2DOF Machinery for Intelligent Manufacturing Systems.....	129
<i>Ana Djuric; Waguih H. ElMaraghy</i>	
Mobile Systems for Machining Large Work Pieces.....	135
<i>Neugebauer, R., Priber, U., Rentzsch, H., Ihlenfeldt, S., Hoffmann, D.</i>	
Methodology for Flexibility Measurement in Semi-automatic Production.....	141
<i>Rogalski, S.; Wicaksono, H.</i>	
Automatic Configuration (Plug & Produce) of Robot Systems – Data-Interpretation and Exchange.....	147
<i>G. Reinhart, S. Krug</i>	
ADAPTABILITY AND EMERGENCE.....	153
Enhanced Survivability- a Framework of Self-Healing Mechanisms' Installation Using Axiomatic Design	154
<i>D.T. Matt</i>	
Dealing with the unpredictable: An Evolvable Robotic Assembly Cell	160
<i>M. Onori, P. Neves, H. Akillioglu, A. Maffei, A. Hofmann, N. Siltala</i>	
The Manufacturing Adaptability Scorecard - a tool to analyze the benefit of autonomous production processes	166
<i>Corinna Fohrholz, Norbert Gronau</i>	
Framework for Distributed Manufacturing Systems.....	172
<i>H. Nylund, K. Salminen, P. H. Andersson</i>	
Conception and evaluation of an age-differentiated task analysis and screening method	178
<i>M. Keil, B. Spanner-Ulmer</i>	
Adaptive Process Chain Optimisation of Manufacturing Systems	184
<i>B. Denkena, J. Henjes, L. E. Lorenzen</i>	
Mapping the Task Time Performance of Human-Centred Assembly Systems	189
<i>R. Folgado, E. Henriques, P. Peças</i>	
PART III: PRODUCT AND PRODUCTION DEVELOPMENT AND CO-DEVELOPMENT	195
CO-EVOLUTION OF PRODUCTS, PROCESSES AND MANUFACTURING SYSTEMS	196
From Dedicated to Platform-Based Co-Development of Products and Manufacturing Systems.....	197
<i>M.T. Michaelis, H. Johannesson</i>	
Nature Inspired Co-evolution in the Manufacturing World of Artefacts	203
<i>T. AlGeddawy, H. A. ElMaraghy</i>	
From product architecture to assembly sequence: a method to develop conceptual Design for Assembly based on interface analysis.....	209
<i>C. Favi, M. Germani</i>	
Networked product and production development for lithium-ion batteries.....	215
<i>Kampker, A.; Franzkoch, B.; Nowacki, C.</i>	
Requirements Management as a Success Factor for Simultaneous Engineering.....	221
<i>G. Reinhart, J.F. Meis</i>	
VARIANT-ORIENTED MODELLING AND MANAGEMENT OF VARIATION	227
Bottom-Up Component Oriented FE-Modelling of Machine Tools.....	228
<i>A. Dadalau, A. Verl</i>	
Assessment of the product based time expanding effect.....	234
<i>Jander, H., Spanner-Ulmer, B.</i>	
Feature-based component description for functional graded parts.....	239
<i>F. Bauer, D. Dettmer, J. Gausemeier</i>	
Towards a Feature-Based and Fine-Grain Product Repository for Heterogeneous Computer-Aided Systems	245
<i>M. M. Uddin, Y.-S. Ma</i>	
Sustainable System Risk Analysis: A Triple Bottom Line Approach.....	251
<i>Z. A. Ali-Qureshi, W. ElMaraghy</i>	
PRODUCT, PROCESS AND SYSTEMS MODELLING, PROTOTYPING AND DEVELOPMENT	257
Construction of a Digital Facebow.....	258
<i>E. Solaberrieta, A. Arias, O. Etxaniz, R. Minguez</i>	
Evaluation of RFID Technology Application in Production of Fiber-Reinforced Plastics	263
<i>T. R. Philipp, G. Reinhart</i>	

Selecting Virtual Reality Tools in relation with their use context.....	269
<i>R. G. J. Damgrave, D. Lutters, J. P. Thalen</i>	
A Framework Enabling Data Integration for Virtual Production	275
<i>Reinhard, R.; Meisen, T.; Beer, T.; Schilberg, D.; Jeschke, S.</i>	
A Foundation for Integrating Hand Held Mobile Devices in a Computer Aided Manufacturing Environment	281
<i>R. Hedrick, J. Urbanic</i>	
Parametric Internal Matrix Structures for Components Built by Fused Deposition Modelling.....	287
<i>L. Villalpando, J. Urbanic</i>	
An Experimental Study to Determine Geometric and Dimensional Accuracy Impact Factors for Fused Deposition ..	293
<i>S. Saqib, J. Urbanic</i>	
Flexible Tool-path Generation for Variable Geometry	299
<i>Sawula, D.A., Lin, Y.P., Fleisig, R.V., Spence, A.D.</i>	
A System for Providing Visual Feedback of Machine Faults	305
<i>K. Hughes, G. Szkilnyk, B. Surgenor</i>	
An innovative cross wedge rolling preforming operation for warm forging.....	310
<i>H. Kache, R. Nickel, B.-A. Behrens</i>	
System Dynamic Models and Real-time Simulation of Complex Material Flow Systems.....	316
<i>S. Hoher, P. Schindler, S. Göttlich, V. Schleper, S. Röck</i>	
Early identification of manufacturing process influences on product failure behaviour	322
<i>Stefan Bracke, Stephan Haller</i>	
The aspects of energy in the Body in White process regarding product development and production planning.....	328
<i>M. Schacht, R. Schulte, F. Mantwill</i>	
Refining Process Logic From CNC Part Programmes for Integrated STEP-NC Compliant Manufacturing	333
<i>X. Zhang, A. Nassehi, V. G. Dhokia, S. T. Newman</i>	
ENABLERS OF CHANGE	339
Synchronisation of Distributed Configuration Tools using Features Models	340
<i>Brecher, C.; Karlberger, A.; Herfs, W.</i>	
Change Management as an Enabler of Employee Knowledge Integration into the Design of Planning Procedures...	346
<i>Tracht, K., Weikert, F., Funke, L.</i>	
A reconfiguration concept to enable versatile production in the automotive factories.....	352
<i>Sarfraz Ul Haque Minhas, Ulrich Berger</i>	
Methodology for the Support of Reconfiguration Processes in the Automotive Body Shop.....	358
<i>Reinhart, G.; Meling, F.</i>	
Gripper with Integrated Three-Dimensional Force Detection.....	364
<i>K. Tracht, S. Hogreve, F. Borchers</i>	
Change-Beneficial Process Architectures and the Human as a Change Enabler	370
<i>Dennis Gossmann; Carsten Wagner; Tim Klemke; Peter Nyhuis</i>	
Adaptive and Selective Assembling of Microscope Objectives	376
<i>K.-P. Zocher</i>	
PART IV: GLOBAL COMPETITIVENESS AND SUSTAINABILITY	383
DRIVERS, ENABLERS, STRATEGIES AND INDICES.....	384
An Asian Perspective on Global Sourcing	385
<i>Schneider, C., Finke, G., Sproedt, A., Alard, R., Schönsleben, P.</i>	
Strategic Evaluation of Technology Chains for Producing Companies	391
<i>Reinhart, G., Schindler, S.</i>	
Strategic Impact of Global Production – How to Find the Success Measures.....	397
<i>Heinrich Bürstner</i>	
Co-opetition as a facilitator of manufacturing competitiveness: opportunities and threats.....	403
<i>F. Ehrenmann, M. Reiss</i>	
Enabling Competitive Design of Next Generation Reconfigurable Manufacturing Enterprises.....	409
<i>T. Masood, R.H. Weston</i>	
ECONOMIC SUSTAINABILITY FOR MANUFACTURING SYSTEMS AND PRODUCTS	415
Integrated Environmental and Economic Assessment of Production Systems.....	416
<i>A. Sproedt, J. Plehn, C. Schneider, P. Schönsleben</i>	

Towards Sustainable Development and Sustainable Production in Finnish Manufacturing Industry.....	422
<i>Mikko Koho, Mikko Tapaninaho, Seppo Torvinen</i>	
Employee Participation in the Implementation of Lean Production Systems.....	428
<i>U. Dombrowski; T. Mielke; S. Schulze</i>	
Challenges Facing Manufacturing to Move towards a Green Society with Clean Energy Vehicles.....	434
<i>Masaru Nakano</i>	
Qualitative Growth and Sustainability in Organizations – An Overview	439
<i>B. Seeberg, M. Monauni</i>	
MANAGING COMPLEXITY OF PRODUCTS, PROCESSES AND MANUFACTURING SYSTEMS	445
Enabling Car Body Customization through Automotive Framing Systems Design.....	446
<i>A. Al-Zaher, W. ElMaraghy, Z. J. Pasek</i>	
Parts and Assembly Equipment Complexity Dependency Matrix	452
<i>S.N. Samy, H. ElMaraghy</i>	
Analysis of Market Demand Parameters for the Evaluation of Flexibility in Forming Technology	458
<i>Avemann, J.; Schmitt, S.O.; Ederer, T.; Lorenz, U.; Groche, P.</i>	
PRODUCTION AND CO-OPERATION WITHIN GLOBAL NETWORK	464
Ensuring Human Safety with Offline Simulation and Real-time Workspace Surveillance for Welding of Assemblies.....	465
<i>C. Thomas, F. Busch, B. Kuhlenkoetter, J. Deuse</i>	
A Method for Multi-Scale Modeling of Production Systems.....	471
<i>Neumann M., Constantinescu C., Westkämper E.</i>	
Efficient analysis, handling and use of customer complaints.....	476
<i>Effey, T.; Schmitt, R.</i>	
Adaptive, Location-based Shop Floor Control.....	482
<i>Reinhart, G.; Niehues, M.; Ostgathe, M.</i>	
Relocation in Production networks of a Multi-National-Enterprise.....	488
<i>Ponton, P.; Jaehne, M.; Mueller, E.</i>	
A Modeling Approach to Analyze Redundancy in Manufacturing Systems.....	493
<i>K. Windt, M.-T. Hütt, M. Meyer</i>	
Influence of the European Emissions Trading Scheme on MRO Provider of the Civil Aviation Industry	499
<i>Tracht, K.; Funke, L.; Weikert, F.</i>	
DYNAMIC AND GLOBAL MANUFACTURING CAPACITY AND CAPABILITIES	505
Shifting Bottlenecks in Production Control	506
<i>Schuh, G.; Potente, T.; Fuchs, S.</i>	
Simulation Based Detailed Planning for Agile Manufacturing.....	512
<i>Berend Denkena, Leif-Erik Lorenzen, Max Krüger, Justin Schmidt</i>	
Product Variety Management in Design and Manufacturing: Challenges and Strategies	518
<i>T. AlGeddawy, H. ElMaraghy</i>	
Capability Assessment and Valuation of the Implementation of Lean Production Methods	524
<i>Lanza, G., Jondral, A., Book, J.</i>	
PART V: ENTERPRISE AND KNOWLEDGE MANAGEMENT	531
MANUFACTURE AND ORGANIZATIONAL STRUCTURES	532
A Novel Tool for Assessing and Improving Make-to-Order and Assemble-to-Order Production Systems.....	533
<i>M. Koho, S. Torvinen</i>	
Reference Planning Processes for Series Production	539
<i>N. Macke, S. Rulhoff, J. Stjepandic</i>	
The effect of manufacturing response time on mitigating the demand risk and facility disruption.....	544
<i>Niroomand, I.; Baygi, M.B.; Kuzgunkaya, O.; Bulgak, A.A.</i>	
TRANSFORMATION AND CHANGE MANAGEMENT	550
Cladistic Classification of Ancient Manufacturing Forms and Technologies	551
<i>C. Rose-Anderssen, J. Baldwin, K. Ridgway</i>	
Real-time capable Production Planning and Control in the Order Management of built-to-order Companies	557
<i>G. Schuh, T. Brosze, S. Kompa, C. Meier</i>	

Cross-company coordination in Built-to-Order Production Networks in Machinery and Equipment Industry	563
<i>V. Stich, C. Schmidt, C. Meier, S. Cuber, S. Kompa</i>	
Type-Oriented Factory Planning with Solution Space Management.....	569
<i>A. Kampker, B. Franzkoch, R. Hilchner</i>	
Optimum Restoration of the Shared Pallets Distribution Among Factories and Warehouses.....	574
<i>Takafumi Matsuura, Satomi Wada, Kazumiti Numata</i>	
A Consortium Leveraged Learning Network.....	580
<i>V. Townsend, J. Urbanic</i>	
Extension of Value Stream Design for the Simulation of Autonomous Production Systems	586
<i>Theuer, H.</i>	
Building Blocks in an Experimental and Digital Factory.....	592
<i>E. Müller, S. Horbach</i>	
A new Approach to Simulation in Production Management.....	598
<i>Lass, S.</i>	
COMPLEX / DYNAMIC SUPPLY CHAINS AND LOGISTICS	604
A Planning Approach for In-plant Milk Run Processes to Optimize Material Provision in Assembly Systems	605
<i>Markus Droste, Jochen Deuse</i>	
Impact of Machine-Driven Capacity Constellations on Performance and Dynamics of Job-Shop Systems	611
<i>C. Toonen, D. Lappe, R.V. Donner, B. Scholz-Reiter</i>	
Operator Scheduling Under the Lean Manufacturing Principles in Over-Size Product Manufacturing Facilities	617
<i>Kadir Ertogral, Ali Akgunduz</i>	
KNOWLEDGE MANAGEMENT AND LEARNING	623
Training concept and structure of the Learning Factory advanced Industrial Engineering.....	624
<i>Dinkelmann, M.; Riffelmacher, P.; Westkämper, E.</i>	
Supporting Project Execution for Adaptable Production Systems using a flexible software tool.....	630
<i>E. Müller, U. Wagner</i>	
Production pilot for co-operation in factory development.....	636
<i>D. Chen, T. Kjellberg, R. Svensson, G. Sivard</i>	
Surrogate Modelling as an Enabler for Self Optimisation for Production Processes	642
<i>Reisgen U., Beckers M., Buchholz G., Willms K., Lose J., Perge, J., Schmitt, R.</i>	
Application Protocols for Standardising of Processes and Data in Digital Manufacturing.....	648
<i>Schallow J., Magenheimer K., Deuse J., Reinhart G.</i>	
Partner Selection in Innovation Alliance	654
<i>Chen, X.; Riedel, R.; Mueller, E.</i>	
Human-Centred Model for Application of Lean Production Systems in Networks.....	660
<i>Uygun, Y.; Straub, N.</i>	