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April 13, 2017. Originally developed by the University of Michigan College of Engineering's Research Center, a reconfigurable manufacturing system (RMS) is a system used by manufacturers that emphasizes the importance of being able to change and evolve rapidly in order to adjust its productivity capacity and functionality.

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Topical areas for consideration include, but are not limited to, green manufacturing, sustainable/cleaner manufacturing, reconfigurable robotic systems, eco-innovation, design for sustainability, reconfigurable manufacturing systems, modular robots, high efficiency machining, high performance robotic machine tools, decentralized robot control system, advanced energy technology, renewable and nonrenewable energy.

Sustainability | Special Issue : Sustainable Manufacturing
A reconfigurable manufacturing system (RMS) is one designed at the outset for rapid change in its structure, as well as its hardware and software components, in order to quickly adjust its production capacity and functionality within a part family in response to sudden market changes or intrinsic system change.

Reconfigurable manufacturing system - Wikipedia
sustainable production systems. A promising way toward the sustainable production passes through the design and intensive development of reconfigurable manufacturing systems. The

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A reconfigurable manufacturing system (RMS) is a paradigm that can address many of the challenges posed by the modern market. Accordingly, substantial research is now being conducted on RMS, focusing on various levels of decision-making (strategic, tactical and operational).

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Integrated reconfigurable manufacturing systems and smart ...
Sustainable Products - Sustainable Manufacturing Processes - Sustainable Manufacturing Systems - Crosscutting Topics in Sustainable Manufacturing - Industry 4.0 - Sustainable supply chains - Product life cycle - Product recovery, reuse and remanufacturing - Circular Economy

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reconfigurable manufacturing systems rmss which possess the advantages of both dedicated serial lines and flexible manufacturing systems were introduced in the mid 1990s to address the challenges initiated by globalization the principal goal of an rms is to enhance the responsiveness of manufacturing systems to unforeseen changes in product demand

The book deals with reconfigurable manufacturing system as the right way to achieving sustainable and energy efficient production and definition of the requirements in order to achieve sustainable production in manufacturing enterprises, which are essential to enhancement of efficiency, productivity and profitability in future industrial processes. The modern techniques are designed to radically improve profitability, customer satisfaction, throughput time and environmental responsibility. This e-book presents research requirements that have been identified as important for manufacturing companies in sustainable production. Reviewers: prof. RNDr. Milan Malcho, PhD. prof. dr hab. in . Jozef Matuszek"

The book develops manufacturing concepts and applications beyond physical production and towards a wider manufacturing value chain incorporating external stakeholders that include suppliers of raw materials and parts, customers, collaborating manufacturing companies, manufacturing service providers, and environmental organisations. The focal point of the value chain remains as a manufacturing system and its operations whiles flows of parts/materials and information and services across the supply/value chain tiers are taken into account. The book emphasises on the two innovative paradigms of Reconfigurable Manufacturing Systems (RMS) and the 4th industrial revolution (Industry 4.0) along with their incorporated development. RMS, as a relatively new paradigm, has been introduced to meet the requirements of 'the factories of the future', which is aimed by Industry 4.0, though introducing greater responsiveness and customised flexibility into production systems, in which changes in product volumes and types occur regularly. Manufacturing responsiveness can be achieved by RMS through reconfiguring the production facilities according to changing demands of products and new market conditions. The book addresses challenges of mass-customisation and dynamic changes in the supply-chain environment by focusing on developing new techniques related to integrability, scalability and re-configurability at a system level and manufacturing readiness in terms of financial and technical feasibility of RMS. It demonstrate the expected impacts of an RMS design on operational performance and its supply/value chain in the current/future manufacturing environment facing dynamic changes in the internal/external circumstances. In order to establish a circular economy through the RMS value chain, an integrated data-based reconfiguration link is introduced to incorporate information sharing amongst the value chain stakeholders and facilitate grouping products into families with allocation of the product families to the corresponding system configurations with optimal product-process allocation. Decision support systems such as multi criteria decision making tools are developed and applied for the selection of product families and optimising product-process configuration. The proposed models are illustrated through real case studies in applicable manufacturing firms.

This book develops innovative techniques from operational research and management science for the design and implementation of a reconfigurable manufacturing system (RMS), and subsequently analyzes and assesses their performance. A reconfigurable manufacturing system (RMS) is a paradigm that can address many of the challenges posed by the modern market. Accordingly, substantial research is now being conducted on RMS, focusing on various levels of decision-making (strategic, tactical and operational). However, as a relatively new research area, there are still only very few books and articles available on reconfigurable manufacturing system design and management. In addition to filling that gap, this book provides a forum for investigating, exchanging ideas on, and disseminating the latest advances in the broad area of RMS applications in today's industry. Gathering contributions by experts from academia, industry and policy-making, it represents an essential contribution to the existing literature on manufacturing and logistics in general and industry 4.0 in particular.

The objective of this book is to support readers facing the urgency, challenges, analysis, and methodologies to reconfiguration. It presents a comprehensive framework for reconfiguring manufacturing enterprises and provides a set of valuable conceptual frameworks and methodologies for analyzing, evaluating, and assessing reconfiguration indices. This book offers practical guidance for implementing the Fourth Industrial Revolution (Industry 4.0). It presents open-ended problems pertaining to the concepts covered in the book and provides a new approach for reconfiguring industrial systems. Not only is this book for industrialists and academics, it will also appeal to undergraduate and graduate students studying industrial, mechanical, and manufacturing engineering. Scholars and practitioners in operations management will also find this book of interest.

Sustainability is increasingly becoming a crucial concern in many aspects of life. Even though, there is a relatively growing interest from both academic researchers and practitioners in various design aspects of sustainability, one can see that design issues of sustainable manufacturing systems have not received adequate attention. Through an extensive literature review on design for sustainability and sustainability issues, it is observed that, attaining sustainability in manufacturing needs a huge amount of effort and needs to take into consideration many aspects from different perspectives. These include considering the sustainability in both the closed loop supply chain (CLSC) and the manufacturing system levels simultaneously, considering Cellular Manufacturing Systems (CMSs), considering reconfigurability for the production systems, considering Hybrid Manufacturing-Remanufacturing Systems as well as considering the recovery options such as recycling and remanufacturing. This research presents a simultaneous investigation of Reconfigurable Cellular Manufacturing Systems and Hybrid Manufacturing-Remanufacturing Systems (HMRSs), and proposes an integrated approach in design optimization, analysis, and process planning aspects as an attempt to address to a large number of design issues for Sustainable Manufacturing Systems, while the options of remanufacturing, recycling, and disposing are introduced. Four mathematical model have been developed. Third part cellular remanufacturing systems design are considered within the first model, which is initially formulated as a mixed integer non-linear program that incorporates multi-period production planning, dynamic system reconfiguration, and workforce management with deterministic production requirements. It consists the costs of machines maintenance and overhead, relocation costs for machines installation and removal, part holding cost, workers' costs of salary, hiring, and firing, part intercellular movement cost, machine procurement cost, internal production cost, machine operating cost, the cost of acquiring the returned products, setup cost for disassembly operations, disassembly cost, the inventory cost of the returned products, parts disposal cost. Linearization procedures are proposed to convert it into a linearized mixed integer programming formulation. This linearized mixed integer program is solved using an exact solution (ES) procedure through the simplex-based branch and cut procedure of CPLEX software. The second model considered the design of cellular hybrid manufacturing-remanufacturing system, where manufacturing new products using an outsourced parts and remanufacturing using returned products are performed in the same facility by using shared resources. The overall objective of the model is to minimize the total cost of the three main categories of costs; 1) Machine cost: maintenance and overhead costs, relocation costs of installation and removal of machines, machine procurement costs, and machine operating costs, 2) Costs associated with manufacturing and remanufacturing: production costs for both new and remanufactured components, holding cost for new components, holding cost for remanufactured components, setup cost for new components, setup cost for remanufactured components, 3) Costs associated with returned products for remanufacturing: cost of acquiring the returned products, setup cost for disassembly operations, disassembly cost, and inventory cost of the returned products. Computational results and sensitivity analysis for an important design features are also reported.The third model addresses the same attributes as the second one but an important extension is the introduction of recycling (for the end-of-life parts) and disposing of the parts with no further use. In addition, the new parts production in the third model are totally depends on the recycled parts coming from the recycling center, wherein the second model it depends on the raw material purchasing from outsourcing. As the third model is the most comprehensive one, which considers a closed loop supply chain starts from a cellular hybrid manufacturing-remanufacturing system and ends with the customer zone, through the introducing of different centers like, collection, disassembly, and recycling centers, and in order to have one more step toward the design of sustainable closed loop supply chain, the fourth model are formulated. The fourth model is designed to minimize the carbon foot prints and the total cost which contains the opening costs for different centers and the transportation costs between these centersKeywords: Sustainability, Sustainable manufacturing system, cellular manufacturing systems design, Reconfigurable manufacturing system, mixed integer programming, Hybrid manufacturing-remanufacturing system, Closed loop supply chain, Reverse logistics, Carbon footprints, Facility location.

The concrete tools manufacturing enterprises need to thrive in today's global environment For a manufacturing enterprise to succeed in this current volatile economic environment, a revolution is needed in restructuring its three main components: product design, manufacturing, and business model. The Global Manufacturing Revolution is the first book to focus on these issues. Based on the author's long-standing course work at the University of Michigan, this unique volume proposes new technologies and new business strategies that can increase an enterprise's speed of responsiveness to volatile markets, as well as enhance the integration of its own engineering and business. Introduced here are innovations to the entire manufacturing culture: An original approach to the analysis of manufacturing paradigms Suggested methods for developing creativity in product design A quantitative analysis of manufacturing system configurations A new manufacturing "reconfigurable" paradigm, in which the speed of responsiveness is the prime business goal An original approach to using information technology for workforce empowerment The book also offers analysis and original models of previous manufacturing paradigms' technical and business dimensions—including mass production and mass customization—in order to fully explain the current revolution in global manufacturing enterprises. In addition, 200 original illustrations and pictures help to clarify the topics. Globalization is creating both opportunities and challenges for companies that manufacture durable goods. The tools, theories, and case studies in this volume will be invaluable to engineers pursuing leadership careers in the manufacturing industry, as well as to leaders of global enterprises and business students who are motivated to lead manufacturing enterprises and ensure their growth.

The changing manufacturing environment requires more responsive and adaptable manufacturing systems. The theme of the 4th International Conference on Changeable, Agile, Reconfigurable and Virtual production (CARV2011) is "Enabling Manufacturing Competitiveness and Economic Sustainability". Leading edge research and best implementation practices and experiences, which address these important issues and challenges, are presented. The proceedings include advances in manufacturing systems design, planning, evaluation, control and evolving paradigms such as mass customization, personalization, changeability, re-configurability and flexibility. New and important concepts such as the dynamic product families and platforms, co-evolution of products and systems, and methods for enhancing manufacturing systems' economic sustainability and prolonging their life to produce more than one product generation are treated. Enablers of change in manufacturing systems, production volume and capability scalability and managing the volatility of markets, competition among global enterprises and the increasing complexity of products, manufacturing systems and management strategies are discussed. Industry challenges and future directions for research and development needed to help both practitioners and academicians are presented.

First Published in 2000. Routledge is an imprint of Taylor & Francis, an informa company.

This book features state-of-the-art contributions from two well-established conferences: Changeable, Agile, Reconfigurable and Virtual Production Conference (CARV2020) and Mass Customization and Personalization Conference (MCPC2020). Together, they focus on the joint design, development, and management of products, production systems, and business for sustainable customization and personalization. The book covers a large range of topics within this domain, ranging from industrial success factors to original contributions within the field.

The five-volume set IFIP AICT 630, 631, 632, 633, and 634 constitutes the refereed proceedings of the International IFIP WG 5.7 Conference on Advances in Production Management Systems, APMS 2021, held in Nantes, France, in September 2021.* The 378 papers presented were carefully reviewed and selected from 529 submissions. They discuss artificial intelligence techniques, decision aid and new and renewed paradigms for sustainable and resilient production systems at four-wall factory and value chain levels. The papers are organized in the following topical sections: Part I: artificial intelligence based optimization techniques for demand-driven manufacturing; hybrid approaches for production planning and scheduling; intelligent systems for manufacturing planning and control in the industry 4.0; learning and robust decision support systems for agile manufacturing environments; low-code and model-driven engineering for production system; meta-heuristics and optimization techniques for energy-oriented manufacturing systems; metaheuristics for production systems; modern analytics and new AI-based smart techniques for replenishment and production planning under uncertainty; system identification for manufacturing control applications; and the future of lean thinking and practice Part II: digital transformation of SME manufacturers: the crucial role of standard; digital transformations towards supply chain resiliency; engineering of smart-product-service-systems of the future; lean and Six Sigma in services healthcare; new trends and challenges in reconfigurable, flexible or agile production system; production management in food supply chains; and sustainability in production planning and lot-sizing Part III: autonomous robots in delivery logistics; digital transformation approaches in production management; finance-driven supply chain; gastronomic service system design; modern scheduling and applications in industry 4.0; recent advances in sustainable manufacturing; regular session: green production and circularity concepts; regular session: improvement models and methods for green and innovative systems; regular session: supply chain and routing management; regular session: robotics and human aspects; regular session: classification and data management methods; smart supply chain and production in society 5.0 era; and supply chain risk management under coronavirus Part IV: AI for resilience in global supply chain networks in the context of pandemic disruptions; blockchain in the operations and supply chain management; data-based services as key enablers for smart products, manufacturing and assembly; data-driven methods for supply chain optimization; digital twins based on systems engineering and semantic modeling; digital twins in companies first developments and future challenges; human-centered artificial intelligence in smart manufacturing for the operator 4.0; operations management in engineer-to-order manufacturing; product and asset life cycle management for smart and sustainable manufacturing systems; robotics technologies for control, smart manufacturing and logistics; serious games analytics: improving games and learning support; smart and sustainable production and supply chains; smart methods and techniques for sustainable supply chain management; the new digital lean manufacturing paradigm; and the role of emerging technologies in disaster relief operations: lessons from COVID-19 Part V: data-driven platforms and applications in production and logistics: digital twins and AI for sustainability; regular session: new approaches for routing problem solving; regular session: improvement of design and operation of manufacturing systems; regular session: crossdock and transportation issues; regular session: maintenance improvement and lifecycle management; regular session: additive manufacturing and mass customization; regular session: frameworks and conceptual modelling for systems and services efficiency; regular session: optimization of production and transportation systems; regular session: optimization of supply chain agility and reconfigurability; regular session: advanced modelling approaches; regular session: simulation and optimization of systems performances; regular session: AI-based approaches for quality and performance improvement of production systems; and regular session: risk and performance management of supply chains *The conference was held online.