

1. Record Nr.	UNINA9910847080103321
Titolo	Advances in Manufacturing IV : Volume 2 - Production Engineering: Digitalization, Sustainability and Industry Applications // edited by Justyna Trojanowska, Agnieszka Kujawska, Ivan Pavlenko, Jozef Husar
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Springer, , 2024
ISBN	3-031-56444-8
Edizione	[1st ed. 2024.]
Descrizione fisica	1 online resource (428 pages)
Collana	Lecture Notes in Mechanical Engineering, , 2195-4364
Disciplina	670
Soggetti	Industrial management Computer-aided engineering Cooperating objects (Computer systems) Business information services Production management Industrial Management Computer-Aided Engineering (CAD, CAE) and Design Cyber-Physical Systems Business Information Systems Operations Management
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Intro -- Preface -- Organization -- Contents -- Digital Transformation and Innovation -- Exploring the Potential of Digital Twins for New Product Design and Development: A Review of Research Gaps -- 1 Introduction -- 2 Research Problem -- 2.1 Methodology -- 2.2 Digital Twins in Product Design and Development -- 2.3 Role of Digital Twins in Product Design and Development -- 3 Research Gap Identification Results -- 3.1 Gap 1: Integration of Diverse Data Sources -- 3.2 Gap 2: Model Accuracy and Validation -- 3.3 Gap 3: Optimization and Decision Support -- 4 Discussion -- 4.1 Integration of Diverse Data Sources: Architecture and Integration Techniques -- 4.2 Model Accuracy and Validation: Data Fusion and Machine Learning Techniques -- 4.3 Optimization and Decision Support: AI and Analytics Integration -- 5

Conclusion -- References -- Innovation of the Manufacturing Company by Using of Digitization Tools -- 1 Introduction -- 1.1 Problem Definition -- 2 Work Methodology -- 3 Results and Discussion -- 3.1 The 1st Degree of Polyvalence -- 3.2 The 2nd Degree of Polyvalence -- 3.3 The 3rd Degree of Polyvalent -- 3.4 The 4th Degree of Polyvalent -- 4 Conclusions -- References -- Recent Trends in Artificial Intelligence and Machine Learning Methods Applied to Water Jet Machining -- 1 Introduction -- 1.1 AI and ML in Manufacturing -- 2 Application of AI and ML in Water Jet Machining -- 2.1 Process Optimization -- 2.2 Defect Detection and Quality Control -- 2.3 Predictive Maintenance -- 3 Challenges and Future Directions -- 3.1 Physics Informed AI -- 3.2 Optimization -- 4 Conclusion -- References -- Virtual and Augmented Reality: Past, Present, and Future -- 1 Introduction -- 2 Literature Review -- 2.1 Virtual Reality -- 2.2 Augmented Reality -- 2.3 History of VR and AR -- 3 Research Problem -- 4 Results -- 4.1 Bibliometric Research -- 4.2 Case Studies. 5 Future Paths and Conclusions -- References -- Mixed Reality as a Perspective Education Tool in Industry 5.0 -- 1 Introduction -- 1.1 Industry 5.0 -- 1.2 Mixed Reality -- 2 Materials and Methods -- 2.1 Software Tools for MR -- 2.2 Hardware for MR -- 2.3 MR Implementation Methodology -- 3 Results -- 4 Conclusion -- References -- Lean Manufacturing in Digital Transformation of Manufacture -- 1 Introduction -- 2 Research Problem -- 3 Results -- 3.1 Transformation 1: Advanced Manufacturing Technologies -- 3.2 Transformation 2: Digital Factory -- 3.3 Transformation 3: Eco Factory -- 3.4 Transformation 4: End-To-End Engineering -- 3.5 Transformation 5: Human-Centered Organization -- 3.6 Transformation 6: Intelligent Manufacturing -- 3.7 Transformation 7: Value Chain Oriented Open Factory -- 4 Discussion -- 5 Conclusions -- References -- The Scenario Approach to the Concept of Maintenance of Technical Systems of Urban Engineering -- 1 An Introduction -- 2 Assumptions of the SmartMaintenance Concept -- 3 Selected Exploitation Decision-Making Problems -- 4 Scenario Methods in the SmartMaintenance Concept -- 5 Scenario Methods and Tools in the Aspect of Exploitation Issues -- 6 The Way of Implementing the Exploitation Scenario Procedure in Accordance with the SmartMaintenance Concept -- 6.1 Phase A: Preparation of the Exploitation Scenario Task -- 6.2 Phase B: Examination of the Exploitation Features of the Scenario Environment -- 6.3 Phase C: Construction and Description of the Future Exploitation Variants -- 6.4 Phase D: Assessment of the Decision-Making Context -- 7 Scenario Module of Exploitation Policy -- 8 Summary and Conclusions -- References -- Manufacturing Line-Level Root Cause Analysis and Bottleneck Detection Using the Digital Shadow Concept and Cloud Computing -- 1 Introduction -- 2 Methods -- 2.1 System Architecture -- 2.2 Root-Cause Algorithm. 2.3 Bottleneck Detection -- 3 Case Study -- 3.1 Root-Cause Analysis -- 3.2 Bottleneck Detection -- 4 Conclusions -- References -- 3D Printing in Non-planar Layers as a New Tool for Increasing the Quality of FDM Production -- 1 Introduction -- 1.1 The Current State of Non-planar Plastic Layering Technology -- 2 Overview of FDM Technology-Current Challenges in FDM Production Quality -- 2.1 Fundamentals in FDM Technology -- 2.2 Non-planar Layer 3D Printing Technique -- 2.3 Utilizing Rhinoceros and Grasshopper for Non-planar Layer G-code Generation -- 3 Results -- 4 Conclusion -- References -- Potential of Graph Database Visualization of the Supplier Network to Increase Resilience in Multi-tier Supply Chains -- 1 Introduction -- 2 Literature Review -- 2.1 Supply Chain Integration -- 2.2 Multi-tier Management

and Supply Chain Resilience -- 3 Research Methodology -- 3.1 Gap Analysis and Research Objectives -- 3.2 NoSQL Databases -- 3.3 Neo4j Open Source Graph Database -- 4 Results from Visualization of Multi-tier Supply Chains Using Neo4j Graph Database -- 4.1 Premise -- 4.2 Modeling of the Neo4j Database -- 4.3 Functionality Testing: Search Phrases -- 5 Discussion -- 6 Conclusions -- References -- A Racing Approach: The Evolution of Racing Techniques, A Systematic Literature Review -- 1 Introduction -- 2 Literature Review -- 2.1 Statistical Inference -- 2.2 Racing Techniques, F-Race and Iterated F-Race -- 3 Research Problem -- 4 Results -- 4.1 Bibliometric Research -- 4.2 Case Studies -- 5 Future Paths and Conclusions -- References -- The Impact of PLM Systems on the Digital Transformation of Manufacturing Companies -- 1 Introduction -- 2 Characteristics of PLM Systems -- 3 Requirements that Manufacturing Companies Must Meet in the Era of Industry 4.0 -- 4 The Process of Implementing PLM Systems in a Manufacturing Company. 5 Effects of Implementing PLM Systems -- 6 Effects of PLM System Implementation in a Manufacturing Company - Case Studies -- 6.1 Effects of Implementing the PLM System at the Designer's Workplace -- 6.2 Effects of Implementing the PLM System in the Design and Technology (Production Support) Department -- 6.3 Effects of Using PLM Systems on an Inter-organizational Scale (Supply Chain) -- 7 Discussion and Conclusions -- References -- Using Visions Systems and Manipulators in Industry 4.0 -- 1 Introduction -- 1.1 Industrial Robots -- 1.2 Manipulators -- 1.3 Vision Systems -- 2 Streamlining the Packaging Process by Partially Robotizing the Production Line -- 2.1 Object Detection -- 3 Testing -- 4 Summary and Conclusion -- References -- Geometric Complexity Evaluation Method for Adoption of Additive Manufacturing -- 1 Introduction -- 2 Geometric Complexity Evaluation Method -- 2.1 Existing Way of Calculating Complexity -- 2.2 The Proposed Method of Evaluating Complexity of Parts -- 2.3 Workflow for Part Complexity Evaluation (Fig. 1) -- 3 Results and Discussion -- 4 Conclusion -- References -- Using AI Tools to Enhance the Risk Management Process in the Automotive Industry -- 1 Introduction -- 2 Literature Review on Automotive Risk Management -- 3 Methodology and Materials -- 4 Results of the Parallel Implementation -- 5 Discussion and Comparison -- 6 Conclusions -- References -- Optimization of Production Processes -- Innovations - Changes in the Environment of the Production Planning Process in Enterprises -- 1 Introduction -- 2 Research Problem -- 3 Research Results -- 3.1 Market Research -- 3.2 Implementation of Innovations, New Products and Technologies -- 4 Discussion -- 5 Conclusions -- References -- Heuristic-Based Algorithm for Suboptimal Scheduling Realized in Hybrid Production Environment -- 1 Introduction. 2 Task Scheduling Algorithm for MTO-MTS Hybrid Production -- 3 Experimental Verification of the Developed Algorithm -- 4 Summary and Conclusions -- References -- Minimum Job Completion Time in Petri Nets -- 1 Introduction -- 2 Static and Dynamic Petri Nets -- 2.1 Static Petri Net -- 2.2 Dynamic Petri Net -- 2.3 Timed Petri Net -- 2.4 GPenSIM -- 3 Mapping Firing Times as Arc Weights -- 3.1 The Role of Time in Petri Nets -- 3.2 Firing Times as Arc Weights -- 4 Finding the Minimum Job Completion Time -- 5 Application Example -- 5.1 Implementation of the Model -- 5.2 Simulation Results -- 6 Discussion and Conclusion -- References -- Optimization and Evaluation of Storage Processes Based on a Selected Example -- 1 Introduction - Industrial Revolutions -- 2 Characteristics of the Studied Company -- 3 Analysis and Evaluation of the Storage Process -- 4 Optimization

of Storage Processes -- 5 Summary -- References -- Comparison of Different Production Systems Approaches of a Manufacturing Line in the Aeronautical Sector -- 1 Introduction -- 2 Different Manufacturing Systems -- 2.1 Pulse Lines -- 2.2 Docking Lines -- 3 Associated Problems in the Literature -- 3.1 Simple Assembly Line Balancing Problem -- 3.2 Resource Constrained Project Scheduling Problem -- 4 Case of Study -- 4.1 Simple Assembly Line Balancing Problem Results -- 4.2 Resource Constrained Project Scheduling Problem Results -- 4.3 Combination of the Two Problems -- 5 Conclusions -- References -- Cooperation Between Companies in Technology Management Really Matters - Explored Through PLS-SEM Modelling -- 1 Introduction -- 2 TM Essentials -- 3 Research Methodology -- 4 PLS-SEM Modelling -- 5 Discussion -- 6 Conclusions -- References -- Proactive Resource Maintenance in Product-as-a-Service Business Models: A Constraints Programming Based Approach for MFP Offerings Prototyping -- 1 Introduction. 2 Literature Review.

Sommario/riassunto

This book describes cutting-edge research and technologies aimed at increasing the efficiency of production processes and supporting the implementation of Industry 4.0 and Industry 5.0 solutions in production. Gathering peer-review contributions to the 8th International Scientific-Technical Conference MANUFACTURING 2024, held on May 14–16, 2024, in Poznan, Poland, it reports on research on and applications of artificial intelligence and digital technologies to improve the production process. It also presents augmented/virtual and mixed reality tools that can be used or have been tested in the manufacturing industry and for education and training purposes. Last but not least, it highlights cutting-edge solutions for green and sustainable production. Offering a timely, practice-oriented reference guide for both researchers and practitioners in manufacturing, this book is also intended to bridge the gap between university and industry, fostering a closer communication and cooperation between them.
