



Digital Manufacturing Industry 4 0 7 Springer

**Vishal Ashok Wankhede,VIMAL
K.E.K,Pankaj Sahlot**



Digital Manufacturing Industry 4.0 Springer:

Industry 4.0 for Manufacturing Systems Vishal Ashok Wankhede, VIMAL K.E.K, Pankaj Sahlot, 2025-04-24 The book highlights the importance of intelligent decision making in advanced production systems and optimization of process parameters using fuzzy based multi criteria decision making tools It discusses the decision making aspects of Industry 4.0 using machine learning and optimization techniques and helps in moving toward the digitalization of manufacturing systems It further covers several important topics including the role of digital twins in advanced manufacturing processes machine learning based prediction of overall equipment effectiveness intelligent quality control tools and life cycle assessment models in Industry 4.0 Key features Presents a conceptual framework to measure the readiness of adopting Industry 4.0 in advanced manufacturing systems Discusses the impact of smart manufacturing on sustainable development and integration of Industry 4.0 and additive manufacturing Covers topics such as intelligent automation systems machine learning based preventive maintenance and the Internet of Things enabled additive manufacturing in Industry 4.0 Explains cyber physical system integration with Industry 4.0 technologies cyber physical systems in industrial robotics and green cyber physical systems Illustrates optimization of process parameters using fuzzy based multi criteria decision making tools and life cycle assessment models in Industry 4.0 This book is primarily written for senior undergraduates graduate students and academic researchers in the fields of industrial engineering production engineering mechanical engineering supply chain management and manufacturing engineering

Semantic Technologies for Intelligent Industry 4.0 Applications Archana Patel, Narayan C. Debnath, 2023-10-06 As the world enters the era of big data there is a serious need to give a semantic perspective to the data in order to find unseen patterns derive meaningful information and make intelligent decisions Semantic technologies offer the richest machine interpretable rather than just machine processable and explicit semantics that are being extensively used in various domains and industries These technologies reduce the problem of large semantic loss in the process of modelling knowledge and provide sharable reusable knowledge and a common understanding of the knowledge As a result the interoperability and interconnectivity of the model make it priceless for addressing the issues of querying data These technologies work with the concepts and relations that are very close to the working of the human brain They provide a semantic representation of any data format unstructured or semi structured As a consequence data becomes real world entity rather than a string of characters For these reasons semantic technologies are highly valuable tools to simplify the existing problems of the industry leading to new opportunities However there are some challenges that need to be addressed to make industrial applications and machines smarter This book aims to provide a roadmap for semantic technologies and highlights the role of these technologies in industry The book also explores the present and future prospects of these semantic technologies along with providing answers to various questions like Are semantic technologies useful for the next era industry 4.0 Why are semantic technologies so popular and extensively used in the industry Can

semantic technologies make intelligent industrial applications Which type of problem requires the immediate attention of researchers Why are semantic technologies very helpful in people s future lives This book will potentially serve as an important guide towards the latest industrial applications of semantic technologies for the upcoming generation and thus becomes a unique resource for scholars researchers professionals and practitioners in the field Computational Intelligence in Industry 4.0 and 5.0 Applications JOSEPH BAMIDELE AWOTUNDE,Kamalakanta Muduli,BISWAJIT BRAHMA,2025-02-06 Industry 4 0 and 5 0 applications will revolutionize production enabling smart manufacturing machines to interact with their environments These machines will become self aware self learning and capable of real time data interpretation for self diagnosis and prevention of production issues They will also self calibrate and prioritize tasks to enhance production quality and efficiency Computational Intelligence in Industry 4 0 and 5 0 Applications examines applications that merge three key disciplines computational intelligence CI Industry 4 0 and Industry 5 0 It presents solutions using Industrial Internet of Things IIoT technologies augmented by CI based techniques modeling controls estimations applications systems and future scopes These applications use data from smart sensors processed through enhanced CI methods to make smart automation more effective Industry 4 0 integrates data and intelligent automation into manufacturing using technologies like CI the IoT the IIoT and cloud computing It transforms data into actionable insights for decision making and process optimization essential for modern competitive businesses managing high speed data integration in production processes Currently Industries 4 0 and 5 0 are undergoing significant transformations due to advances in applying artificial intelligence AI big data analytics telecommunication technologies and control theory These applications are increasingly multidisciplinary integrating mechanical control and information technologies However they face such technical challenges as parametric uncertainties external disturbances sensor noise and mechanical failures To address these this book examines such CI technologies as fuzzy logic neural networks and reinforcement learning and their application to modeling control and estimation It also covers recent advancements in IIoT sensors microcontrollers and big data analytics that further enhance CI based solutions in Industry 4 0 and 5 0 systems *Industrial Revolution 4.0* Dr.Ashish Bhanabhai Patel,2025-05-31 The book Industrial Revolution 4 0 Concepts Technologies and Applications provides a comprehensive insight into the transformative impact of Industry 4 0 on modern manufacturing and industrial systems It serves as a valuable academic and practical reference for students researchers and professionals in mechanical production and industrial engineering Key Topics Covered Introduction to Industry 4 0 Historical evolution of industrial revolutions leading up to the fourth industrial era Core Technologies Cyber Physical Systems CPS Internet of Things IoT and Industrial IoT IIoT Artificial Intelligence AI and Machine Learning Big Data Analytics Cloud and Edge Computing Additive Manufacturing 3D Printing Augmented Reality AR and Virtual Reality VR Digital Twins Blockchain in Industry Smart Manufacturing and Automation Integration of smart sensors robotics and real time data in modern production environments Sustainable and Smart Supply

Chain Management Role of Industry 4.0 in enabling efficient transparent and eco friendly supply chains Applications in Indian Industries Focus on textile automobile and MSME sectors with practical case studies Challenges and Future Directions Addressing cybersecurity workforce readiness and technological barriers Handbuch Industrie 4.0 Birgit Vogel-Heuser, Michael ten Hompel, Thomas Bauernhansl, 2024-11-07 Mit der Neuauflage des erfolgreichen Werkes wird die Geschichte der vierten industriellen Revolution fortgeschrieben und der Dynamik Rechnung getragen mit der die Vision in den vergangenen zwei bis drei Jahren weiterentwickelt und verwirklicht wurde Experten aus Wissenschaft und Technik beleuchten verschiedene Facetten der Industrie 4.0 sowohl aus akademischer als auch aus praktischer Sicht und schaffen gleichermaßen einen Überblick über den Stand der Technik und die Vision selbst Dies gelingt nicht zuletzt dank einer ausgewogenen Mischung aus wissenschaftlichen Erkenntnissen Praxisbeispielen und Beiträgen Die Themen der Beiträge reichen von Basistechnologien bspw cyber physische Systeme über Integrations und Migrationsansätze bis hin zu Geschäftsmodellen und Dienstleistungen für die Industrie 4.0 Zudem werden die Datensicherheit und auch rechtliche Aspekte behandelt In der 3. Auflage werden die Themenfelder um Künstliche Intelligenz aktuelle Mobilfunkstandards und den daraus resultierenden Potentialen für eine zukünftige Plattformökonomie erweitert Die dritte Auflage wurde bearbeitet und erweitert erscheint nun in 3 Bänden Dieser zweite Band beinhaltet neue und bearbeitete Beiträge zur Automatisierung Online ist dieses Nachschlagewerk auch bei Springer Reference verfügbar *Introduction to Industrial Internet of Things and Industry 4.0* Sudip Misra, Chandana Roy, Anandarup Mukherjee, 2021-01-07 Industrial IoT IIoT and Industry 4.0 are newly developing and fast emerging domains of interest among students researchers and professionals in academia and industry Due to the popular demand of this topic Introduction to Industrial Internet of Things and Industry 4.0 is written to serve a diverse readership from the domains of computer science and engineering mechanical engineering information technology industrial engineering electronics engineering and other related branches of engineering Based on the lead author's massive open online courses MOOCs this book can be used as a textbook on the emerging paradigm of Industry 4.0 and IIoT as well as a reference for professionals working in sectors of IIoT The book covers the significant aspects of IIoT in detail including sensors actuators data transmission and data acquisition which form the core of IIoT Topics and concepts are presented in a comprehensive manner so that readers can develop expertise and knowledge The book helps beginners to gain a basic idea of Industry 4.0 and IIoT as the first section is an overview of IoT applications infrastructure based protocols cloud computing and fog computing The second section is designed to impart a basic knowledge of Industry 4.0 and IIoT as well as of the different phases of development in industry Delving into more advanced areas other sections in the book cover The business models and reference architecture of IIoT The technological aspects of Industry 4.0 and IIoT Predictive and prescriptive analytics applied in IIoT based implementations Applications and case studies of IIoT Key enabling technologies of IIoT To aid students and professional master IIoT and Industry 4.0 the book includes conceptual questions exercises and learning

objectives Intelligent Manufacturing and Industry 4.0 Alka Chaudhary,Vandana Sharma,Ahmed Alkhayyat,2024-11-27

The use of intelligence in manufacturing has emerged as a fascinating subject for academics and businesses everywhere This book focuses on various manufacturing operations and services which are provided to customers to achieve greater manufacturing flexibility as well as widespread customization and improved quality with the help of advanced and smart technologies It describes cyber physical systems and the whole product life cycle along with a variety of smart sensors adaptive decision models high end materials smart devices and data analytics Intelligent Manufacturing and Industry 4 0 Impact Trends and Opportunities focuses on Intelligent Manufacturing and the design of smart devices and products that meet the demand of Industry 4 0 manufacturing and cyber physical systems along with real time data analytics for Intelligent Manufacturing The usage of advanced smart and sensing technologies in Intelligent Manufacturing for healthcare solutions is discussed as well Popular use cases and case studies related to Intelligent Manufacturing are addressed to provide a better understanding of this topic This publication is ideally designed for use by technology development practitioners academicians data scientists industry professionals researchers and students interested in uncovering the latest innovations in the field of Intelligent Manufacturing Features Presents cutting edge manufacturing technologies and information to maximise product exchanges and production Discusses the improvement in service quality product quality and production effectiveness Conveys how a manufacturing company s competitiveness can increase if it can manage the turbulence and changes in the global market Presents how intelligence production is essential in Industry 4 0 and how Industry 4 0 offers greater manufacturing flexibility as well as widespread customisation improved quality and increased productivity Covers the ways businesses handle the challenges of generating an increasing number of customised items with quick time to market and greater quality Includes popular use cases and case studies related to intelligent manufacturing to provide a better understanding of this discipline **Innovation in PMBOK through Industrial Revolution 4.0** Muhammad Ali Musarat,Muhammad Irfan,Maria Ghufra,Wesam Salah Alaloul,2024-04-25 In this textbook for upper undergraduate and postgraduate students Dr Ali and colleagues provide the reader with information on the effect of Industrial Revolution 4 0 on the construction industry particularly regarding PMBOK knowledge areas The authors furnish readers with an understanding of IR 4 0 and reasons for adopting it and provide an in depth insight into the impact of IR 4 0 on technology and society particularly in the construction industry Further to this they also compare traditional and IR 4 0 project manager s competencies so that readers can develop their understanding of Project Management Knowledge areas and how IR 4 0 can be used to enhance these knowledge areas The book is structured logically and sequentially to benefit even novice readers as they progress from basic to more advanced topics related to IR 4 0 and PMBOK The final main chapter of this book provides an in depth discussion of the enhancement of PMBOK knowledge areas using IR 4 0 including topics such as project integration management IR 4 0 enhancements such as digitalization and a conceptual framework for industry betterment By

the end of the book readers will have the knowledge and skills to apply IR 4.0 techniques in their future careers in the construction industry. This book is an invaluable resource for students of construction engineering and management at upper undergraduate and postgraduate levels and for existing industry professionals as part of their continuous professional development.

Industry 4.0 Technologies for Education P. Kaliraj, T. Devi, 2022-12-27

The transformative digital technologies developed for Industry 4.0 are proving to be disruptive change drivers in higher education. Industry 4.0 technologies are forming the basis of Education 4.0. *Industry 4.0 Technologies for Education: Transformative Technologies and Applications* examines state of the art tools and technologies that comprise Education 4.0. Higher education professionals can turn to this book to guide curriculum development aimed at helping produce the workforce for Industry 4.0. The book discusses the tools and technologies required to make Education 4.0 a reality. It covers online content creation, learning management systems and tools for teaching, learning and evaluating. Also covered are disciplines that are being transformed by Industry 4.0 and form the core of Education 4.0 curricula. These disciplines include social work, finance, medicine and healthcare. Mobile technologies are critical components of Industry 4.0 as well as Education 4.0. The book looks at the roles of the Internet of Things, IoT, 5G and cloud applications in creating the Education 4.0 environment. Highlights of the book include: Technological innovations for virtual classrooms to empower students; Emerging technological advancements for educational institutions; Online content creation tools; Moodle as a teaching, learning and evaluation tool; Gamification in higher education; A design thinking approach to developing curriculum in Education 4.0; Industry 4.0 for Service 4.0 and Research 4.0 as a framework for higher education institutions; Eye tracking technology for Education 4.0; The challenges and issues of the Internet of Things, IoT in teaching and learning.

Manufacturing from Industry 4.0 to Industry 5.0 Dimitris Mourtzis, 2024-06-26

Manufacturing from Industry 4.0 to Industry 5.0: Advances and Applications unfolds establishing three main pillars: i) it investigates the theoretical background of the current industrial practice within the framework of industry 4.0 by presenting its key definitions and backbone technologies; ii) it discusses the methods and state of the art developments employed in the ongoing digital transformation of companies worldwide to promote more resilient, sustainable and human centric smart manufacturing and production networks; and iii) it outlines a strategic plan for the transition from industry 4.0 to industry 5.0. Written by an international group of expert scientists, this volume offers an overview of the most recent research in the field and provides actionable insights to benefit audiences in both academia and industry. Appeals to readers with its systematic and coherent approach that includes fundamental theoretical concepts as well as applied practical knowledge. Includes state of the art information on disruptive smart manufacturing technologies, real life case studies of their impact in business scenarios and gap analysis, creating an evidence based path to recognize the opportunities and challenges originating from an industry 4.0 to industry 5.0 transition. Serves as a guide to the next generation of engineers and facilitates making the next manufacturing paradigm a reality.

Agile Business Leadership Methods for Industry 4.0 Bülent

Akkaya,2020-10-05 Agile Business Leadership Methods for Industry 4 0 is a collection of innovative research on new leadership styles that will develop agile managers and business leaders who can improve company success in the fast paced environments created by Industry 4 0 *Future of Work, Work-Family Satisfaction, and Employee Well-Being in the Fourth Industrial Revolution* Abe, Ethel Ndidiamaka,2020-11-13 Disruptions are being caused in the workplace due to the development of advanced software technology and the speed at which these technological advancements are being produced These disruptions could take diverse forms and affect various aspects of work and the lives of entities in the workplaces and families of the individual employees Work and family are caught in the crossfire between technological disruptions and human adaptation Hence there is a need to assess the overall effect that the Fourth Industrial Revolution would have on work employee work family satisfaction and employee well being *Future of Work Work Family Satisfaction and Employee Well Being in the Fourth Industrial Revolution* is a critical reference source that discusses practical solutions and strategies to manage challenges and address fears regarding the effect of the Fourth Industrial Revolution on the future of employment and the workforce Featuring research on topics such as corporate governance job satisfaction and mental health this book is ideally designed for human resource professionals business managers industry professionals government officials policymakers corporate strategists consultants work life balance experts human resources software developers business policy experts academicians researchers and students *Handbook of Engineering Management* Lucy Lunevich,2023-12-13 The Engineering Management discipline remains complex and multidisciplinary and has progressed and broadened in scope significantly over the last 10 20 years Previously the discipline has been fragmented and not aligned with the purposes of economic development mega project delivery and technological progress Digital engineering has revolutionized the field of engineering by introducing digital tools and technologies to the design creation operation and maintenance of physical systems products and services It has enabled more efficient effective and sustainable solutions and has the potential to drive significant innovation and improve the way we design build and operate physical systems This handbook addresses new content of complexity by offering new engineering concepts such as simple complicated and complex which have never been included in this discipline before and will generate interest from higher education financial institutions and technology companies *Handbook of Engineering Management The Digital Economy* focuses on multidisciplinary integration and complex evolving systems It discusses the incorporation of a system of systems along with engineering economic strategies for sustainable economic growth This handbook highlights functional leadership as the main part of an engineering manager s competency and discusses how to form alliances strategically In addition it presents a comprehensive guide for the implementation of an environmental management system and shows how environmental and social impacts can be assessed in an organization applying digital tools This handbook also brings together the three important areas of Engineering Management Knowledge Management the Digital Economy and Digital Manufacturing In addition this handbook provides a

comprehensive guide to implementing an environmental management system and shows how environmental and social impacts in an organization can be assessed using digital tools Based on the authors practical experience it describes various management approaches and explains how such a system can be used to prioritize actions and resources increase efficiency minimize costs and lead to better more informed decision making It is essential to follow a systematic approach and to ask the right questions whether the system is managed and implemented by humans AI or a combination of both This handbook is laid out in a series of simple steps and dispels the jargon and myths surrounding this important management tool This handbook is an ideal read for engineering managers project managers industrial and systems engineers supply chain engineers professionals who want to advance their knowledge and graduate students

Fundamentals and Applications of Additive Manufacturing Sharad Kumar Pradhan, Ankit Nayak, Surendra Singh Thakur, Vishal Francis, Aniket Nagargoje, 2025-07-29 Through nine chapters covering software hardware solid based liquid based and powder based 3D printing processes this textbook provides a comprehensive but easy to understand and application oriented guide to the fundamentals and applications of 3D printing Readers are guided through various topics in a structured and logical manner that takes them from an initial comprehensive discussion of the topic to specialized chapters on advanced areas The authors compare additive manufacturing with conventional processes introduce computer aided design explore data preparation techniques including 3D printing interfaces and provide information regarding STL files model slicing toolpath generation 3D printing material solid liquid powder based 3D printing processes post processing techniques advancements and future trends in 3D printing The book also discusses printing accuracy precision and tolerance and open source data preparation software such as Fusion 360 and Tinkercad To ensure readers comprehensive understanding of the different printing methods the book discusses solid liquid and powder based 3D printing processes and their principles workings applications post processing techniques and future trends Images and descriptive figures effectively illustrate the concepts and processes throughout aiding in the understanding and retention of the concepts and processes Every chapter includes learning outcomes discussion topics self check exercises and multiple choice questions help teachers and students to assess their learning The broad coverage and engaging discussion format make this an ideal textbook for undergraduate and postgraduate students and an accessible reference for enthusiasts with elementary knowledge In guiding readers from the basic concepts through to individual methodologies and printing techniques it is invaluable to any reader who aims for a career related to any related application and industry

Transformative und agile Innovationssysteme Alfons Botthof, Jakob Edler, Katrin Hahn, Hartmut Hirsch-Kreinsen, Matthias Weber, Jan Wessels, 2023-12-13 Die Muster nach denen Innovationen verlaufen haben sich in den letzten Jahren deutlich gewandelt Dies zeigt sich an offeneren Innovationsstrategien von Unternehmen steigenden Anforderungen an Geschwindigkeit und Agilität von Innovationsprozessen der Ausweitung globaler Kooperationen und insbesondere der wachsenden Bedeutung digitaler

Technologien mit neuen spezifischen Anforderungen Gleichzeitig haben sich die gesellschaftlichen und kologischen Herausforderungen f r die Probleml sungsf higkeit durch Innovationen massiv erh ht Die Konsequenz ist dass das etablierte Innovationssystem unter Wandlungsdruck ger t Vor allem muss auch Innovationspolitik ihre strategischen Ziele ausweiten und gesellschaftlich gew nschte Wirkungen von Innovation verfolgen Allerdings sind die mittel und langfristigen Herausforderungen dieser Entwicklung f r das gesamte Innovationssystem und eben auch f r Innovationspolitik bislang nur zu erahnen Diese Fragen werden im vorliegenden Buch kritisch in einer interdisziplin ren Perspektive diskutiert Dabei steht die Frage im Vordergrund wie die Transformation des Innovationssystems vorangetrieben und seine Agilit t gesteigert werden k nnen <https://creativecommons.org/licenses/by-nc-nd/4.0/>

Reviving Businesses With New Organizational Change Management Strategies Geada, Nuno, Anunciação, Pedro, 2021-06-25 With the gradual resumption of economic activity most businesses are facing a range of challenges associated with implementing measures to protect the health and safety of their employees Some employers had to put certain business activities on hold and even start new ones in order to keep their organizations operating efficiently The global COVID 19 pandemic plus digital transformation and the pressure of Industry 4 0 have challenged companies to manage their organizations in newfound ways In the short term they are facing enormous changes to their business plans in the long term they must adapt and continue to progress on their original goals Reviving Businesses With New Organizational Change Management Strategies is a crucial reference book that analyzes the sensitivity of organizations to change management based on methodologies and tools to control impacts to understand how employees will be impacted in their environment and to learn how technology will help both the industry and professionals This book also explores types of frameworks that are built for communication and business continuity the importance of collaborative and interactive relationships for change management and emotional factors and issues for change management Covering topics including change management models cybersecurity Health 4 0 privacy and security and information systems management this text is essential for managers executives human resources managers academicians students and researchers looking for successful business strategies that are leading to increased efficiency performance and growth

Cyber Security Applications for Industry 4.0 R Sujatha, G Prakash, Noor Zaman Jhanjhi, 2022-10-20 Cyber Security Applications for Industry 4 0 CSAI 4 0 provides integrated features of various disciplines in Computer Science Mechanical Electrical and Electronics Engineering which are defined to be Smart systems It is paramount that Cyber Physical Systems CPS provide accurate real time monitoring and control for smart applications and services With better access to information from real time manufacturing systems in industrial sectors the CPS aim to increase the overall equipment effectiveness reduce costs and improve efficiency Industry 4 0 technologies are already enabling numerous applications in a variety of industries Nonetheless legacy systems and inherent vulnerabilities in an organization s technology including limited security mechanisms and logs make the move to smart systems particularly challenging Features Proposes a conceptual framework

for Industry 4.0 based Cyber Security Applications concerning the implementation aspect Creates new business models for Industrialists on Control Systems and provides productive workforce transformation Outlines the potential development and organization of Data Protection based on strategies of cybersecurity features and planning to work in the new area of Industry 4.0 Addresses the protection of plants from the frost and insects automatic hydroponic irrigation techniques smart industrial farming and crop management in agriculture relating to data security initiatives The book is primarily aimed at industry professionals academicians and researchers for a better understanding of the secure data transition between the Industry 4.0 enabled connected systems and their limitations *Handbuch Industrie 4.0: Recht, Technik, Gesellschaft*

Walter Frenz, 2020-03-24 Das Handbuch bietet einen Gesamtberblick über Industrie 4.0 und gibt zugleich Lösungen für wichtige praktische Fragen Ausgangspunkt ist dabei das Recht mit seinen aktuellen Herausforderungen Zuordnung der Daten wem gehören sie Vorgaben der EU Datensicherheit Datenschutz Europäische Datenschutzgrundverordnung Cyberangriffe Wettbewerbsrecht Zugangsansprüche gegen Monopolisten zulässiger und verbotener Informationsaustausch mögliche Kooperationen Sodann werden Einzelbereiche von Industrie 4.0 Internet of Production Maschinenbau Künstliche Intelligenz Elektromobilität autonomes Fahren Verkehr Medizin Bauwesen Energiewirtschaft etc in ihren Besonderheiten beleuchtet Allgemeine Entwicklungen aus dem Management der digitalen Transformation der Unternehmen und der Arbeitswelt sowie ethische Fragen schließen sich an **Handbook of Research on Autopoiesis and Self-Sustaining**

Processes for Organizational Success Pańkowska, Małgorzata, 2021-01-29 Autopoietic systems show a remarkable property in the way they interact with their environment on the one hand building blocks and energy including information are exchanged with the environment which characterizes them as open systems on the other hand any functional mechanisms the way the system processes incorporates building blocks and responds to information are totally self determined and cannot be controlled by interventions from the environment Information systems in an organization seem to accept the autopoietic system way of development and can help managers to understand the operations of their organizations better The Handbook of Research on Autopoiesis and Self Sustaining Processes for Organizational Success is an innovative reference book that presents the meaning of autopoietic organizations for social and information science examines how autopoietic organizations are information self producing and self controlled and provides a framework for its development in modern organizations The book focuses on analyzing autopoiesis features such as self managing self sustaining self producing self regulating etc Moreover as the aforementioned characteristics receive a new interpretation in IT environments the book also includes an exploration of IT solutions that enable the development of these characteristics This book is ideal for professionals academicians researchers and students working in the field of information economics and management in various disciplines such as information and communication sciences administrative sciences and management education computer science and information technology **Industrial Waste Heat Utilization** Tobias

Bornemann, 2017-12-19 Für Unternehmen der produzierenden Automobilindustrie stellt Energieeffizienzsteigerung ein elementares Instrument zur Verbesserung der Wettbewerbsfähigkeit dar. Der Fokus dieser Dissertation wird auf die Nutzung von Abwärme industrieller Produktionsprozesse gerichtet. Um die Ressource Abwärme quantifizieren zu können wird eine Abwärmeanalyse im Untersuchungsobjekt durchgeführt. Zur Bewertung der möglichen Abwärmenutzungspfade werden sämtliche thermische sowie elektrische Bedarfe durch Vermessung der energetisch relevanten Prozesse ermittelt. Letztendlich wird die direkte thermische Nutzung von Abwärme durch Einspeisung in werksinterne Wärmeversorgungsnetze als zweckmäßige Nutzungsvariante herausgearbeitet. Wird die zur Verfügung stehende Abwärmemenge neben Kraft-Wärme-Kopplungsanlagen in die Energieversorgung eines Produktionsstandortes integriert, resultiert ein Spannungsfeld. Primäres Ziel dieser Dissertation besteht in dessen Erforschung und der Analyse der Vorteilhaftigkeit bezüglich der hierarchischen Priorisierung der Ressource Abwärme innerhalb von dezentralen Energiesystemen.

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Digital Manufacturing Industry 4 0 7 Springer Introduction

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