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KEY=SCIENCE - LAUREN BEATRICE

EUROPEAN PERSPECTIVES ON SECURITY RESEARCH

Springer Science & Business Media Europe's networked societies of today are shaped by a growing interconnection in almost all areas of life. The complexity of our infrastructures and the concurrent accessibility to means of destruction by terrorist groups and individual perpetrators call for innovative security solutions. However, such evolving innovations inevitably raise fundamental questions of concern in our societies. How do we balance the imperatives of securing our citizens and infrastructures on the one hand, and of protecting of our sacredly held civil liberties on the other? The topical network 'Safety and Security' of acatech - the German Academy of Science and Engineering - invited experts from the science academies of various European countries to share their perspectives on security research and the aspect of safety during a two-day workshop hosted by the Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach-Institut in March 2010. This publication is a compilation of contributions made during the workshop.

CYBER-PHYSICAL SYSTEMS

DRIVING FORCE FOR INNOVATIONS IN MOBILITY, HEALTH, ENERGY AND PRODUCTION

Springer Science & Business Media Today, about 98 percent of microprocessors are already embedded in everyday objects and devices, connected with the outside world through sensors and actuators. They are increasingly networked with one another and on the internet. The physical world and the virtual world - or cyberspace - are merging; cyber-physical systems are developing. Future cyber-physical systems will contribute to security, efficiency, comfort and the health systems as never before, and as a result, they will contribute to solving key challenges of our society, such as the aging population, limited resources, mobility, or energy transition. Germany is in the position to become a leader in international competition thanks to

innovative cyber-physical systems. In this statement, acatech explains what prerequisites must be created and how Germany can overcome the technical, political and social hurdles on the way to achieving this position.

POLICY ANALYSIS IN GERMANY

Policy Press This comprehensive study, part of the International Library of Policy Analysis, brings together for the first time a systemic overview of policy analysis activities in Germany. Written by leading experts in the field – including informed practitioners – it outlines the development of the discipline, identifies its role in academic education and research, and examines its styles and methods. The book also focuses on the role of policy analysis for governments and parliaments, for parties, social partners, and interest groups. By offering a rich and timely analysis of policy analysis in Germany, this book is a valuable resource for academic exchange and for teaching, particularly in the fields of political science, social sciences, economics and geography. Moreover, by its broad, comprehensive understanding of ‘policy analysis’, the book will be of practical relevance and shape the debate for the future development of policy analysis in Germany and the different spheres where it is practised.

PHILOSOPHY AND ENGINEERING

EXPLORING BOUNDARIES, EXPANDING CONNECTIONS

Springer This volume, the result of an ongoing bridge building effort among engineers and humanists, addresses a variety of philosophical, ethical, and policy issues emanating from engineering and technology. Interwoven through its chapters are two themes, often held in tension with one another: “Exploring Boundaries” and “Expanding Connections.” “Expanding Connections” highlights contributions that look to philosophy for insight into some of the challenges engineers face in working with policy makers, lay designers, and other members of the public. It also speaks to reflections included in this volume on the connections between fact and value, reason and emotion, engineering practice and the social good, and, of course, between engineering and philosophy. “Exploring Boundaries” highlights contributions that focus on some type of demarcation. Public policy sets a boundary between what is regulated from what is not, academic disciplines delimit themselves by their subjects and methods of inquiry, and professions approach problems with unique goals and by using concepts and language in particular ways that create potential obstacles to collaboration with other fields. These and other forms of boundary setting are also addressed in this volume. Contributors explore these two themes in a variety of specific contexts, including engineering epistemology, engineers’ social responsibilities, engineering and public policy-making, engineering innovation, and the affective dimensions of engineering work. The book also includes analyses of social and ethical issues with emerging technologies such as 3-D printing and its use in medical applications, as well as social robots. Initial versions of the invited papers included in this book were first presented at the 2014 meeting of the Forum on Philosophy, Engineering, and Technology (fPET), held at Virginia Tech in

Blacksburg, Virginia, USA. The volume furthers fPET's intent of extending and developing the philosophy of engineering as an academic field, and encouraging conversation, promoting a sense of shared enterprise, and building community among philosophers and engineers across a diversity of cultural backgrounds and approaches to inquiry.

PRODUCTION FACTOR MATHEMATICS

STEM, ROBOTICS, MOBILE APPS IN EARLY CHILDHOOD AND PRIMARY EDUCATION

TECHNOLOGY TO PROMOTE TEACHING AND LEARNING

[Springer Nature](#)

THE INTERNET OF THINGS

INDUSTRIE 4.0 UNLEASHED

[Springer](#) *Industrie 4.0 and the Internet of Things* have been positioned on the international stage as important initiatives of a promising future: Who is dealing in data from the digital factory? Germany has its "Plattform Industrie 4.0", China "Made in China 2025" and the USA the "Industrial Internet Consortium". Who is leading the fourth industrial revolution? The digitalization of industry is changing the global economy and society. Technology is supplying the opportunities to do so. Humans must decide just how far artificial intelligence should go, and what machines should learn - to create new and improved work instead of fewer jobs. In addition to Ulrich Sendler and eight German industry and research experts, the CEO of Xinhuanet in Beijing has also contributed to this book.

INTERNET PRIVACY

OPTIONS FOR ADEQUATE REALISATION

[Springer Science & Business Media](#) A thorough multidisciplinary analysis of various perspectives on internet privacy was published as the first volume of a study, revealing the results of the achatech project "Internet Privacy - A Culture of Privacy and Trust on the Internet." The second publication from this project presents integrated, interdisciplinary options for improving privacy on the Internet utilising a normative, value-oriented approach. The ways in which privacy promotes and preconditions fundamental societal values and how privacy violations endanger the flourishing of said values are exemplified. The conditions which must be fulfilled in order to achieve a culture of privacy and trust on the internet are illuminated. This volume presents options for policy-makers, educators, businesses and technology experts how to facilitate solutions for more privacy on the Internet and identifies further research requirements in this area.

MEETING GLOBAL CHALLENGES

GERMAN-U.S. INNOVATION POLICY: SUMMARY OF A SYMPOSIUM

National Academies Press While nations have always competed for territory, mineral riches, water, and other physical assets, they compete most vigorously today for technology-based innovations and the value that flows from them. Much of this value is based on creating scientific knowledge and transforming it into new products and services for the market. This process of innovation is complex and interdisciplinary. Sometimes it draws on the genius of individuals, but even then it requires sustained collective effort, often underpinned by significant national investments. Capturing the value of these investments to spur domestic economic growth and employment is a challenge in a world where the outputs of innovation disseminate rapidly. Those equipped to understand, apply, and profit from new knowledge and technical advances are increasingly able to capture the long-term economic benefits of growth and employment. In response to this new, more distributed innovation paradigm, the National Academies Board on Science, Technology, and Economic Policy (STEP) convened leading academics, business leaders, and senior policymakers from Germany and the United States to examine the strengths and challenges of their innovation systems. More specifically, they met to compare their respective approaches to innovation, to learn from their counterparts about best practices and shared challenges, and to identify cooperative opportunities. The symposium was held in Berlin and organized jointly by the German Institute for Economic Research (DIW) and the U.S. National Academies with support of the German Federal Ministry for Education and Research (BMBF) and the American Embassy in Berlin. Both U.S. and German participants described common challenges on a wide variety of issues ranging from energy security and climate change to low-emissions transportation, early-stage financing, and workforce training. While recognizing their differences in approach to these challenges, participants on both sides drew out valuable lessons from each other's policies and practices. Participants were also aware of the need to adapt to a new global environment where many countries have focused new policy measures and new resources to support innovative firms and promising industries. *Meeting Global Challenges: U.S.-German Innovation Policy* reviews the participants meeting and sets goals and recommendations for future policy.

DEVELOPMENTS IN INFORMATION & KNOWLEDGE MANAGEMENT FOR BUSINESS APPLICATIONS

VOLUME 3

Springer Nature This book provides practical knowledge on different aspects of information and knowledge management in businesses. In contemporary unstable time, enterprises/businesses deal with various challenges—such as large-scale competitions, high levels of uncertainty and risk, rush technological advancements, while increasing customer requirements. Thus, businesses work continually on improving efficiency of their operations and resources towards enabling sustainable solutions based on the knowledge and information accumulated previously. Consequently, this third volume of our subline persists to highlight different approaches of handling enterprise knowledge/information management directing to

the importance of unceasing progress of structural management for the steady growth. We look forward that the works of this volume can encourage and initiate further research on this topic.

POLICY EXPERTISE IN CONTEMPORARY DEMOCRACIES

Routledge In the world of Wikipedia, blogging and citizen journalism where huge masses of information and the capability to disseminate opinions, thoughts and ideas is available at the click of a mouse what is the role and impact of political experts? The contributors to this insightful and original volume argue that across the western world in general, the political expert occupies as important a role today as at any time in the past. The ubiquity of information and the fact that the experts and the organizations to which they are affiliated may be viewed as having an ideological agenda has not diminished their role, influence or status. Governments and the media still rely on them for information and advice whilst organizations in civil society need them in order to provide the evidence, arguments and policy recommendations that are essential to having a voice in the public conversation. By examining how these policy experts and their think tanks continue to exert influence across a range of modern western democracies a better understanding of the role of policy expertise and an examination of how it may develop and evolve throughout the rest of the world is reached.

SUCCESSFUL WOMEN CERAMIC AND GLASS SCIENTISTS AND ENGINEERS

100 INSPIRATIONAL PROFILES

John Wiley & Sons Presents a diverse perspective of successful, inspirational and progressive women in science and engineering Women of today from 29 countries provide overviews of their successful careers, the challenges they faced, and offer advice. They have lived in the same era, and perhaps also the same environment as you. Successful Women Ceramic and Glass Scientists and Engineers: 100 Inspirational Profiles features women born in the 1920's to 1970's. Reflecting a diversity of backgrounds and different sectors of the workforce, their profiles include: — Affiliation, points of contact, accomplishments (most-cited publication, most prestigious recognitions/awards, etc.), personal insight on her best career moment- Brief biography, highlights of her successes, images from her career- Personal commentary on her own career and pointers for younger scientists building careers This book provides novelty, inspiration, motivation and a bright perspective for the next generation of scientists and engineers seeking exciting and fulfilling careers. This book will be invaluable to mentors/professors, students and prospective students in science and engineering, scholars of gender studies, and scientific and engineering societies and organizations. "Lynnette Madsen has done a great service in writing this book, not just for women, but for society at large, because in the twenty-first century, we can no longer underutilize or ignore that half of the best."- Rita Colwell, Director, United States National Science Foundation 1998-2004, Distinguished University Professor, University of Maryland, College Park, and Johns

Hopkins Bloomberg School of Public Health "The book shows that opportunities in science exist in many countries around the world. Reading about the ways that took those women to their current positions is an exciting adventure."– Yury Gogotsi, Professor, Drexel University "In addition to chronicling careers of great scientists, this book presents an array of career paths to young women and men -- a must read."– Dr. Rainer Waser, Professor, Aachen University, Germany "It is inspiring to see that the successful women highlighted in this work are approaching life with courage and joy; they are changing paradigms and serving as voices for young girls. They are passionate about making a difference and breaking barriers; they are classy and fabulous."– Dr. Olivia Graeve, Professor, University of California, San Diego

CCU AND CCS - BUILDING BLOCKS FOR CLIMATE PROTECTION IN INDUSTRY

ANALYSIS, OPTIONS AND RECOMMENDATIONS

utzverlag GmbH Germany wishes to cut its greenhouse gas emissions by 80 to 95 per cent by 2050. However, despite the success to date, the measures which have already been planned and implemented are not sufficient for achieving this ambitious goal. In addition to the energy sector, the largest source of greenhouse gas emissions, German industry is also responsible for releasing considerable volumes of global warming gases. In its Climate Action Plan 2050, the Federal Government has for the first time set a sector target for industry. The present acatech POSITION PAPER analyses the options for (re)utilising and storing CO₂ (Carbon Capture and Utilisation (CCU) and Carbon Capture and Storage (CCS)) which come into consideration for reducing greenhouse gas emissions from industrial processes. It is recommended that a wide-ranging public debate about the use of CCU and CCS be conducted in the near future. Only then will it be possible to take account of reservations about CCU and CCS, further develop suitable technology in good time and bring it to market maturity so that the necessary infrastructure can be planned, approved, funded and constructed.

CONSTRUCTING A GLOBAL TECHNOLOGY ASSESSMENT : INSIGHTS FROM AUSTRALIA, CHINA, EUROPE, GERMANY, INDIA AND RUSSIA

KIT Scientific Publishing

INDUSTRIAL AGENTS

EMERGING APPLICATIONS OF SOFTWARE AGENTS IN INDUSTRY

Morgan Kaufmann Industrial Agents explains how multi-agent systems improve collaborative networks to offer dynamic service changes, customization, improved quality and reliability, and flexible infrastructure. Learn how these platforms can offer distributed intelligent management and control functions with communication, cooperation and synchronization capabilities, and also provide for the behavior specifications of the smart components of the system. The book offers not only an introduction to industrial agents, but also clarifies and positions the vision, on-going

efforts, example applications, assessment and roadmap applicable to multiple industries. This edited work is guided and co-authored by leaders of the IEEE Technical Committee on Industrial Agents who represent both academic and industry perspectives and share the latest research along with their hands-on experiences prototyping and deploying industrial agents in industrial scenarios. Learn how new scientific approaches and technologies aggregate resources such next generation intelligent systems, manual workplaces and information and material flow system Gain insight from experts presenting the latest academic and industry research on multi-agent systems Explore multiple case studies and example applications showing industrial agents in a variety of scenarios Understand implementations across the enterprise, from low-level control systems to autonomous and collaborative management units

SUCCESS IN SIX CUPS OF COFFEE

HOW SMART NETWORKING CONQUERS HIDDEN OBSTACLES

Springer Can it be that in order to reach the investor you need for your new venture, or to find the employer who will give you the chance of a lifetime, you only need to have six cups of coffee? Research tells us there is an average of six intermediate people that form an invisible chain between you and the person who will help you succeed.

RESILIENCE OF CRITICAL INFRASTRUCTURE SYSTEMS

EMERGING DEVELOPMENTS AND FUTURE CHALLENGES

CRC Press With rapid urbanization in developing countries and the emergence of smart systems and integrated intelligent devices, the new generation of infrastructure will be smarter and more efficient. However, due to natural and anthropomorphic hazards, as well as the adverse impact of climate change, civil infrastructure systems are increasingly vulnerable. Therefore, future-proofing and designing resilience into infrastructure is one of the biggest challenges facing the industry and governments in all developing and industrialized societies. This book provides a comprehensive overview of infrastructure resiliency, new developments in this emerging field and its scopes, including ecology and sustainability, and the challenges involved in building more resilient civil infrastructure systems. Moreover, it introduces a strategic roadmap for effective and efficient methods needed for modeling, designing, and assessing resiliency. Features: Includes contributions from internationally recognized scholars in the emerging field of infrastructure resilience. Covers a broad range of topics in infrastructure resilience such as disaster assessment, civil infrastructure and lifeline systems, natural hazard mitigation, and seismic protection. Includes practical global case studies and leading-edge research from several countries. Presents an interdisciplinary approach in addressing the challenges in the emerging field of infrastructure resilience Resilience of Critical Infrastructure Systems: Emerging Developments and Future Challenges serves as a valuable resource for practicing professionals, researchers, and advanced students seeking practical, forward-looking guidance.

VIRTUAL REALITY & AUGMENTED REALITY IN INDUSTRY

Springer Science & Business Media "Virtual Reality & Augmented Reality in Industry" collects the proceedings of the 2nd Sino-German Workshop on the same topic held in Shanghai on April 16-17, 2009. The papers focus on the latest Virtual Reality (VR) / Augmented Reality (AR) technology and its application in industrial processes and presents readers with innovative methods, typical case studies and the latest information on VR/AR basic research results and industrial applications, such as 3D rendering, innovative human-machine design, VR/AR methodology and new tools for assisting in industry, virtual assembly, virtual factory, training and education, etc. The book is intended for computer scientists, IT engineers as well as researchers in Mechanical Engineering. Dr. Dengzhe Ma and Dr. Xiumin Fan are both professors at Shanghai Jiao Tong University, China; Dr.-Ing. Jürgen Gausemeier is a professor of Computer-Integrated Manufacturing at the Heinz Nixdorf Institute, University of Paderborn, Germany; Dipl.-Ing. Michael Grafe is a senior engineer in the Product Engineering Research Group at the Heinz Nixdorf Institute, University of Paderborn.

BIOLOGICAL TRANSFORMATION

Springer Nature The global population is expected to rise to 9.8 billion by the year 2050 - with everyone ultimately striving for prosperity. New methods must therefore be found to achieve more efficient production. Research to date shows that the biological inventory that has evolved: its products, processes, principles and tools, can spur modern technology. The development of technological innovations based on biological concepts, with the goal of particularly innovative and sustainable value creation, today is collectively known as "biological transformation". It results in highly functional products with striking properties that can be both manufactured and utilized in a resource-saving way. In terms of taking responsibility of the good of all people, biological transformation is therefore a path that applied research will have to take. The Fraunhofer-Gesellschaft has recognized the developmental technology potential of biological transformation and sees it as its task not only to drive the relevant research forward, but also to promote public awareness of the topic.

MULTI-DISCIPLINARY ENGINEERING FOR CYBER-PHYSICAL PRODUCTION SYSTEMS

DATA MODELS AND SOFTWARE SOLUTIONS FOR HANDLING COMPLEX ENGINEERING PROJECTS

Springer This book discusses challenges and solutions for the required information processing and management within the context of multi-disciplinary engineering of production systems. The authors consider methods, architectures, and technologies applicable in use cases according to the viewpoints of product engineering and production system engineering, and regarding the triangle of (1) product to be produced by a (2) production process executed on (3) a production system resource. With this book industrial production systems engineering researchers will get a better understanding of the challenges and requirements of multi-disciplinary

engineering that will guide them in future research and development activities. Engineers and managers from engineering domains will be able to get a better understanding of the benefits and limitations of applicable methods, architectures, and technologies for selected use cases. IT researchers will be enabled to identify research issues related to the development of new methods, architectures, and technologies for multi-disciplinary engineering, pushing forward the current state of the art.

DIGITALIZATION

APPROACHES, CASE STUDIES, AND TOOLS FOR STRATEGY, TRANSFORMATION AND IMPLEMENTATION

Springer Nature *What do vehicle manufacturers like Rosenbauer, logistics companies like DB Schenker, a compressor manufacturer such as Bauer, an elevator manufacturer such as ThyssenKrupp, and a hygiene goods manufacturer like Hagleitner all have in common? They all use the potential of digitization to offer smarter and faster services to customers and to actively shape the digital transformation of their business models. This book provides valuable insights with concise and established guidelines for the successful digital transformation of business models. Professionals in management, strategic planning, business development, as well as researchers and students from the fields of innovation/technology management, strategic management, and entrepreneurship would particularly benefit from this book.*

HANDBOOK DIGITAL FARMING

DIGITAL TRANSFORMATION FOR SUSTAINABLE AGRICULTURE

Springer Nature

EMERGENCE, ANALYSIS AND EVOLUTION OF STRUCTURES

CONCEPTS AND STRATEGIES ACROSS DISCIPLINES

Springer Science & Business Media *In May 2002 a number of about 20 scientists from various disciplines were invited by the Berlin-Brandenburg Academy of Sciences and Humanities to participate in an interdisciplinary workshop on structures and structure generating processes. The site was the beautiful little castle of Blankensee, south of Berlin. The disciplines represented ranged from mathematics and information theory, over various fields of engineering, biochemistry and biology, to the economic and social sciences. All participants presented talks explaining the nature of structures considered in their fields and the associated procedures of analysis. It soon became evident that the study of structures is indeed a common concern of virtually all disciplines. The motivation as well as the methods of analysis, however, differ considerably. In engineering, the generation of artifacts, such as infrastructures or technological processes, are of primary interest. Frequently, the analysis aims there at defining a simplified mathematical model for the optimization of the structures and the structure generating processes. Mathematical or heuristic*

methods are applied, the latter preferably of the type of biology based evolutionary algorithms. On the other hand, setting up complex technical structures is not possible by such simplified model calculations but requires a different and less model but rather knowledge-based type of approach, using empirical rules rather than formal equations. In biochemistry, interest is frequently focussed on the structures of molecules, such as proteins or ribonucleic acids. Again, optimal structures can usually be defined.

HANDBOOK OF HUMAN FACTORS AND ERGONOMICS

John Wiley & Sons Discover the latest developments in ergonomics and human factors with the newest edition of this market leading reference In the newly revised Fifth Edition of *Handbook of Human Factors and Ergonomics*, Drs. Gavriel Salvendy and Waldemar Karwowski deliver a comprehensive exploration of workplace environment design, human-machine interfaces, and cutting-edge research on the reduction of health and safety risks. The editors have compiled practical material from an international team of leading experts in ergonomics and human factors that will benefit specialists in the area, as well as safety engineers and human-computer interaction specialists. The Handbook includes information culled from over 7500 sources and features brand new coverage in areas like artificial intelligence, social media, information technology and cybersecurity, and data analytics. Numerous case studies demonstrate the real-world application of the concepts and methods discussed within and showcase the extraordinary developments in the field since the publication of the Fourth Edition in 2012. Readers will also benefit from the inclusion of: A thorough introduction to the human factors function, including the discipline of human factors and ergonomics and human systems design and integration An exploration of the fundamentals of human factors, including sensation and perception, selection and action control, information processing, and mental workload Discussions of the design of equipment, tasks, jobs, and environments, including workplace design, task analysis and design, and training systems An in-depth treatment of design for health, safety, and comfort, including low-back and upper extremity musculoskeletal disorders and the use of personal protective equipment Perfect for ergonomics and human factors engineers at any level of their careers, *Handbook of Human Factors and Ergonomics* will also earn a place in the libraries of design engineers, applied psychologists, human-computer interaction specialists, engineering and technology managers, and safety professionals and industrial hygienists.

PRODUCTION FACTOR MATHEMATICS

Springer Science & Business Media *Mathematics as a production factor or driving force for innovation? Those, who want to know and understand why mathematics is deeply involved in the design of products, the layout of production processes and supply chains will find this book an indispensable and rich source. Describing the interplay between mathematical and engineering sciences the book focusses on questions like How can mathematics improve to the improvement of technological processes and products? What is happening already? Where are the deficits? What*

can we expect for the future? 19 articles written by mixed teams of authors of engineering, industry and mathematics offer a fascinating insight of the interaction between mathematics and engineering.

ENERGY TRANSITION 2030

EUROPE'S PATH TO CARBON NEUTRALITY : AD HOC STATEMENT

With its upcoming presidency of the EU Council, Germany has the opportunity to set European climate policy on a new path. The complete transformation of our energy systems with the aim of greenhouse gas neutrality by the middle of the century is an important and appropriate project involving our entire society. While it is easy to state the target, it is difficult to set out the best way of achieving it. Science has the task of using analysis and advice to contribute to this project in a way that widely considers the latest knowledge possessed by all relevant scientific disciplines. With this in mind, the present ad hoc statement by the German National Academy of Sciences Leopoldina, acatech - National Academy of Science and Engineering, and the Union of the German Academies of Sciences and Humanities aims to provide the German government, in light of its upcoming presidency of the EU Council, with a compact series of recommendations for giving the desired European energy transition the momentum it requires, not least amidst the challenge posed by the coronavirus pandemic.

FACETS OF COMBINATORIAL OPTIMIZATION

FESTSCHRIFT FOR MARTIN GRÖTSCHEL

Springer Science & Business Media Martin Grötschel is one of the most influential mathematicians of our time. He has received numerous honors and holds a number of key positions in the international mathematical community. He celebrated his 65th birthday on September 10, 2013. Martin Grötschel's doctoral descendant tree 1983–2012, i.e., the first 30 years, features 39 children, 74 grandchildren, 24 great-grandchildren and 2 great-great-grandchildren, a total of 139 doctoral descendants. This book starts with a personal tribute to Martin Grötschel by the editors (Part I), a contribution by his very special "predecessor" Manfred Padberg on "Facets and Rank of Integer Polyhedra" (Part II), and the doctoral descendant tree 1983–2012 (Part III). The core of this book (Part IV) contains 16 contributions, each of which is coauthored by at least one doctoral descendant. The sequence of the articles starts with contributions to the theory of mathematical optimization, including polyhedral combinatorics, extended formulations, mixed-integer convex optimization, super classes of perfect graphs, efficient algorithms for subtree-telecenters, junctions in acyclic graphs and preemptive restricted strip covering, as well as efficient approximation of non-preemptive restricted strip covering. Combinations of new theoretical insights with algorithms and experiments deal with network design problems, combinatorial optimization problems with submodular objective functions and more general mixed-integer nonlinear optimization problems. Applications include VLSI layout design, systems biology, wireless network design, mean-risk optimization and gas network optimization. Computational studies include a

semidefinite branch and cut approach for the max k-cut problem, mixed-integer nonlinear optimal control, and mixed-integer linear optimization for scheduling and routing of fly-in safari planes. The two closing articles are devoted to computational advances in general mixed integer linear optimization, the first by scientists working in industry, the second by scientists working in academia. These articles reflect the “scientific facets” of Martin Grötschel who has set standards in theory, computation and applications.

STRATEGIC IMPASSE

SOCIAL ORIGINS OF GEOPOLITICAL DISARRAY

Routledge "Damned if you do; damned if you don't" voices the strategic impasse the USA finds itself in today. Liberal interventionism and globalization—the two pillars of the international system—seem not to work. Explaining the inability of Western powers to enact wise initiatives, Corradi explores the de-coupling of political systems: we are connected with each other but disconnected from policy makers. The paradox of increased connectivity and collective disengagement sets a perverse dynamic between publics and elites, with a serious impact on world affairs. Corradi analyzes the social bases of present dilemmas and how incipient decline can be managed, and paralysis overcome.

HANDBOOK OF INDUSTRY 4.0 AND SMART SYSTEMS

CRC Press Industry 4.0 refers to fourth generation of industrial activity characterized by smart systems and internet-based solutions. This book describes the fourth revolution based on instrumented, interconnected and intelligent assets. The different book chapters provide a perspective on technologies and methodologies developed and deployed leading to this concept. With an aim to increase performance, productivity and flexibility, major application area of maintenance through smart system has been discussed in detail. Applicability of 4.0 in transportation, energy and infrastructure is explored, with effects on technology, organisation and operations from a systems perspective.

INDUSTRY 4.0

CHALLENGES, TRENDS, AND SOLUTIONS IN MANAGEMENT AND ENGINEERING

CRC Press Industry 4.0 is a challenge for today's businesses. It's a concept that encompasses the technological innovations of automation, control, and information technology, as it's applied to manufacturing processes. It's a new topic that recently emerged in academia and industry, with few books that target both management and engineering. This book will cover the new advances and the way to manage competitive organizations. The chapters will include terms of theory, evidence, and/or methodology, and significantly advance social scientific research. This book: Focuses on the latest and most recent research findings occurring on the topic of Industry 4.0 Presents the ways companies around the world are facing today's

technological challenges Assists researchers and practitioners in selecting the correct options and strategies to manage competitive organizations Provides recent advances in international studies Encompasses the main technological innovations in the fields of automation, control, and information technology applied to the manufacturing processes Industry 4.0: Challenges, Trends, and Solutions in Managment and Engineering is designed to increase the knowledge and effectiveness of all managers and engineers in all organizations and activity sectors Carolina Machado has been teaching in the Human Resources Management subjects since 1989 at University of Minho, Portugal. She has been an associate professor since 2004, with experience and research interest areas in the field of Human Resource Management, International Human Resource Management, Human Resource Management in SMEs, Training and Development, Emotional Intelligence, Management Change, Knowledge Management, and Management/HRM in the Digital Age. She is head of the Department of Management and head of the Human Resources Management Work Group at University of Minho, as well as chief editor of the International Journal of Applied Management Sciences and Engineering (IJAMSE). J. Paulo Davim is a professor at the Department of Mechanical Engineering of the University of Aveiro, Portugal. He has more than 30 years of teaching and research experience in Manufacturing, Materials, Mechanical, and Industrial Engineering, with special emphasis in Machining & Tribology. He has also interest in Management, Engineering Education, and Higher Education for Sustainability. He has worked as evaluator of projects for ERC (European Research Council) and other international research agencies.

CHANGE AHEAD? SUSTAINABLE GOVERNANCE IN THE BRICS

Verlag Bertelsmann Stiftung The emergent powers of Brazil, Russia, India, China and South Africa (BRICS) are drawing attention as they change the political and economic map of the 21st century. But does each country have the institutional framework needed to advance its path of development and to effectively address needed reforms with sustainable solutions? With the support of an international network of experts, the Bertelsmann Stiftung has conducted an indicator-based inventory of the state and performance of governance in each BRICS country. Focusing on success factors and policy challenges, this study draws upon the analytic tool of the Sustainable Governance Indicators (SGI), allowing for a cross-national analysis of the need for reform in core policy areas such as economic and social affairs, environmental policies and innovation strategies. At the same time, the capacities of each country's system of governance are explored in each BRICS state. explores the the extent to which problems are identified and strategic solutions implemented in each of the five political systems. By looking at both reform needs and reform capacities, this study points to considerable differences in the prospects for development in each country - prospects which, in some cases, fall short of the expected growth and progress.

THE POLITICAL SYSTEM OF BRAZIL

Springer This volume presents in-depth insights into the polity, politics and policies

of the Brazilian political system. It reassesses the processes of change since the country's return to democracy in the 1980s, in the light of autocratic societal structures and suboptimal institutional design, on the one hand, and the political and economic achievements observed, on the other. In their contributions, top Brazilian and international scholars critically examine the development of the political system with a focus on the Lula and Rousseff administrations, and place their actions and failures in the socio-political and economic context so as to uncover the underlying institutional structures, constellations and diverging interests of actors on various decision-making levels and in different political fields. It is the central aim of this book to present a differentiated portrait of the current political landscape and remaining contradictions in Latin America's largest country.

INTELLECTUAL CAPITAL IN THE DIGITAL ECONOMY

Routledge This book presents a global view of digital and knowledge-based economies and analyses the role of intellectual capital, intellectual capital reports and information technology in achieving sustained competitive advantages in the globalized economy. *Intellectual Capital in the Digital Economy* reviews the state of the art in the field of intellectual capital and intellectual capital reports, exploring core concepts, strengths and weaknesses, gaps, latest developments, the main components of intellectual capital, the main sections of the reports, and indicators of each component. It presents experiences from pioneering companies and institutions in measuring intellectual capital around the world. It incorporates an interdisciplinary and cross-sectorial approach, offering a comparative view of intellectual capital reports elaborated in different regions of the world. This book presents case studies and experiences on the building of intellectual capital reports in organizations. In addition, the book discusses the benefits and challenges of building intellectual capital reports in smart economies and societies. This book is of direct interest to researchers, students and policymakers examining intellectual capital and the knowledge-based economy.

SERVICE ORIENTATION IN HOLONIC AND MULTI-AGENT MANUFACTURING

PROCEEDINGS OF SOHOMA 2017

Springer This book gathers the peer-reviewed papers presented at the seventh edition of the international workshop "Service Orientation in Holonic and Multi-Agent Manufacturing - SOHOMA'17", held on October 19-20, 2017 and organized by the University of Nantes, France in collaboration with the CIMR Research Centre in Computer Integrated Manufacturing and Robotics at the University Politehnica of Bucharest, Romania, the LAMIH Laboratory of Industrial and Human Automation Control, Mechanical Engineering and Computer Science at the University of Valenciennes and Hainaut-Cambrésis, France and the CRAN Research Centre for Automatic Control, Nancy at the University of Lorraine, France. The main objective of SOHOMA'17 was to foster innovation in smart and sustainable manufacturing and logistics systems and in this context to promote concepts, methods and solutions

addressing trends in service orientation of agent-based control technologies with distributed intelligence. The book is organized in eight parts, each with a number of chapters describing research in current domains of the digital transformation in manufacturing and trends in future service and computing oriented manufacturing control: Part 1: Advanced Manufacturing Control, Part 2: Big Data Management, Part 3: Cyber-Physical Production Systems, Part 4: Cloud- and Cyber-Physical Systems for Smart and Sustainable Manufacturing, Part 5: Simulation for Physical Internet and Intelligent & Sustainable Logistics Systems, Part 6: Formal Methods and Advanced Scheduling for Future Industrial Systems, Part 7: Applications and Demonstrators, Part 8: Production and Logistic Control Systems. The contributions focus on how the digital transformation, such as the one advocated by "Industry 4.0" or "Industry of the future" concepts, can improve the maintainability and the sustainability of manufacturing processes, products, and logistics. Digital transformation relates to the interaction between the physical and informational worlds and is realized by virtualization of products, processes and resources managed as services.

DIGITALIZED AND HARMONIZED INDUSTRIAL PRODUCTION SYSTEMS

THE PERFORM APPROACH

CRC Press *On the one side, Industrial competitiveness today means shorter product lifecycles, increased product variety, and shorter times to market and customized tangible products and services. To face these challenges, the manufacturing industry is forced to move from traditional management, control, and automation approaches towards industrial cyber-physical systems. On the other side, several emergent engineering approaches and related Information-Communication-Control-Technologies, such as Multi-Agent-Systems, Service-Oriented Architecture, Plug-and-Produce Systems, Cloud and Fog Technologies, Big Data and Analytics, among others, have been researched during the last years. The confluence of those results with the latest developments in Industrial Digitalization, Systems-of-Cyber-Physical-Systems Engineering, Internet-of-Things, Internet-of-Services, and Industry 4.0 is opening a new broad spectrum of innovation possibilities. The PERFoRM (Production-harmonizEd-Reconfiguration of Flexible Robots and Machinery) approach is one of them. It teaches the reader what it means when production machines and systems are digitalized and migrated into Industrial Cyber-Physical Systems and what happens when they are networked and start collaborating with each other and with the human, using the internet. After a Technology Trend Screening and beyond a comprehensive state-of-the-art analysis about Industrial Digitalization and Industry 4.0-compliant solutions, the book introduces methods, architectures, and technologies applicable in real industrial use cases, explained for a broad audience of researchers, practitioners, and industrialists.*

ENABLING TECHNOLOGIES FOR THE SUCCESSFUL DEPLOYMENT OF INDUSTRY 4.0

CRC Press *This book offers the latest research advances in the field of Industry 4.0, focusing on enabling technologies for its deployment in a comprehensive way. This*

book offers successful implementation of technologies such as artificial intelligence, augmented and virtual reality, autonomous and collaborative robots, cloud computing, and up-to-date guidelines. It investigates how the technologies and principles surrounding Industry 4.0 (e.g., interoperability, decentralized decisions, information transparency, etc.) serve as support for organizational routines and workers (and vice versa). Included are applications of technologies for different sectors and environments as well as for the supply chain management. It also offers a domestic and international mix of case studies that spotlight successes and failures. Features Provides a historical review of Industry 4.0 and its roots Discusses the applications of technologies in different sectors and environments (e.g., public vs. private) Presents key enabling technologies for successful implementation in any industrial and service environment Offers case studies of successes and failures to illustrate how to put theory into practice Investigates how technologies serve as support for organizational routines and workers

SMART ECONOMY IN SMART CITIES

INTERNATIONAL COLLABORATIVE RESEARCH: OTTAWA, ST. LOUIS, STUTTGART, BOLOGNA, CAPE TOWN, NAIROBI, DAKAR, LAGOS, NEW DELHI, VARANASI, VIJAYAWADA, KOZHICODE, HONG KONG

Springer The present book highlights studies that show how smart cities promote urban economic development. The book surveys the state of the art of Smart City Economic Development through a literature survey. The book uses 13 in depth city research case studies in 10 countries such as the North America, Europe, Africa and Asia to explain how a smart economy changes the urban spatial system and vice versa. This book focuses on exploratory city studies in different countries, which investigate how urban spatial systems adapt to the specific needs of smart urban economy. The theory of smart city economic development is not yet entirely understood and applied in metropolitan regional plans. Smart urban economies are largely the result of the influence of ICT applications on all aspects of urban economy, which in turn changes the land-use system. It points out that the dynamics of smart city GDP creation takes 'different paths,' which need further empirical study, hypothesis testing and mathematical modelling. Although there are hypotheses on how smart cities generate wealth and social benefits for nations, there are no significant empirical studies available on how they generate urban economic development through urban spatial adaptation. This book with 13 cities research studies is one attempt to fill in the gap in knowledge base.

PERSONALIZED MEDICINE IN HEALTHCARE SYSTEMS

LEGAL, MEDICAL AND ECONOMIC IMPLICATIONS

Springer This book gathers scientific contributions on comprehensive approaches to personalized medicine. In a systematic and clear manner, it provides extensive information on the methodological, technological, and clinical aspects of high-throughput analytics, nanotechnology approaches, microbiota/human interactions, in-vitro fertilization and preimplantation, and various diseases like cancer. Moreover,

the book analyzes the social and legal aspects of social security systems, healthcare systems and EU law – e.g. the role of solidarity, regulatory possibilities and obstacles, justice and equality, privacy/disclosure of data, and the right to know – from an interdisciplinary perspective. Lastly, it explores the economical and ethical context in the fields of business models, intellectual property issues, the patient/physician relationship, and price discrimination.

PROGNOSTICS AND REMAINING USEFUL LIFE (RUL) ESTIMATION

PREDICTING WITH CONFIDENCE

CRC Press Maintenance combines various methods, tools, and techniques in a bid to reduce maintenance costs while increasing the reliability, availability, and security of equipment. Condition-based maintenance (CBM) is one such method, and prognostics forms a key element of a CBM program based on mathematical models for predicting remaining useful life (RUL). Prognostics and Remaining Useful Life (RUL) Estimation: Predicting with Confidence compares the techniques and models used to estimate the RUL of different assets, including a review of the relevant literature on prognostic techniques and their use in the industrial field. This book describes different approaches and prognosis methods for different assets backed up by appropriate case studies. FEATURES Presents a compendium of RUL estimation methods and technologies used in predictive maintenance Describes different approaches and prognosis methods for different assets Includes a comprehensive compilation of methods from model-based and data-driven to hybrid Discusses the benchmarking of RUL estimation methods according to accuracy and uncertainty, depending on the target application, the type of asset, and the forecast performance expected Contains a toolset of methods and a way of deployment aimed at a versatile audience This book is aimed at professionals, senior undergraduates, and graduate students in all interdisciplinary engineering streams that focus on prognosis and maintenance.

HUMAN + MACHINE

REIMAGINING WORK IN THE AGE OF AI

Harvard Business Press AI is radically transforming business. Are you ready? Look around you. Artificial intelligence is no longer just a futuristic notion. It's here right now--in software that senses what we need, supply chains that "think" in real time, and robots that respond to changes in their environment. Twenty-first-century pioneer companies are already using AI to innovate and grow fast. The bottom line is this: Businesses that understand how to harness AI can surge ahead. Those that neglect it will fall behind. Which side are you on? In Human + Machine, Accenture leaders Paul R. Daugherty and H. James (Jim) Wilson show that the essence of the AI paradigm shift is the transformation of all business processes within an organization--whether related to breakthrough innovation, everyday customer service, or personal productivity habits. As humans and smart machines collaborate ever more closely, work processes become more fluid and adaptive, enabling companies to change them on the fly--or to completely reimagine them. AI is changing all the rules of how

companies operate. Based on the authors' experience and research with 1,500 organizations, the book reveals how companies are using the new rules of AI to leap ahead on innovation and profitability, as well as what you can do to achieve similar results. It describes six entirely new types of hybrid human + machine roles that every company must develop, and it includes a "leader's guide" with the five crucial principles required to become an AI-fueled business. Human + Machine provides the missing and much-needed management playbook for success in our new age of AI. BOOK PROCEEDS FOR THE AI GENERATION The authors' goal in publishing Human + Machine is to help executives, workers, students and others navigate the changes that AI is making to business and the economy. They believe AI will bring innovations that truly improve the way the world works and lives. However, AI will cause disruption, and many people will need education, training and support to prepare for the newly created jobs. To support this need, the authors are donating the royalties received from the sale of this book to fund education and retraining programs focused on developing fusion skills for the age of artificial intelligence.