Advances in Production Management Systems. Artificial Intelligence for Sustainable and Resilient Production Systems.

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Preface

The scientific and industrial relevance of the development of sustainable and resilient production systems lies in ensuring future-proof manufacturing and service systems, including their supply chains and logistics networks. “Sustainability” and “Resilience” are essential requirements for competitive manufacturing and service provisioning now and in the future. Industry 4.0 technologies, such as artificial intelligence; decision aid models; additive and hybrid manufacturing; augmented, virtual, and mixed reality; industrial, collaborative, mobile, and software robots; advanced simulations and digital twins; and smart sensors and intelligent industrial networks, are key enablers for building new digital and smart capabilities in emerging cyber-physical production systems in support of more efficient and effective operations planning and control. These allow manufacturers and service providers to explore more sustainable and resilient business and operating models. By making innovative use of the aforementioned technologies and their enabled capabilities, they can pursue the triple bottom line of economic, environmental, and social sustainability. Furthermore, industrial companies will be able to withstand and quickly recover from disruptions that pose threats to their operational continuity. This is in the face of disrupted, complex, turbulent, and uncertain business environments, like the one triggered by the COVID-19 pandemic, or environmental pressures calling for decoupling economic growth from resource use and emissions.

The International Conference on Advances in Production Management Systems 2021 (APMS 2021) in Nantes, France, brought together leading international experts on manufacturing, service, supply, and logistics systems from academia, industry, and government to discuss pressing issues and research opportunities mostly in smart manufacturing and cyber-physical production systems; service systems design, engineering, and management; digital lean operations management; and resilient supply chain management in the Industry 4.0 era, with particular focus on artificial intelligence-enabled solutions.

Under the influence of the COVID-19 pandemic, the event was organised as online conference sessions. A large international panel of experts (497 from 50 countries) reviewed all the submissions (with an average of 3.2 reviews per paper) and selected the best 377 papers (70% of the submitted contributions) to be included in these international conference proceedings. The topics of interest at APMS 2021 included artificial intelligence techniques, decision aid, and new and renewed paradigms for sustainable and resilient production systems at four-wall factory and value chain levels, comprising their associated models, frameworks, methods, tools, and technologies for smart and sustainable manufacturing and service systems, as well as resilient digital supply chains. As usual for the APMS conference, the Program Committee was particularly attentive to the cutting-edge problems in production management and the quality of the papers, especially with regard to the applicability of the contributions to industry and services.

The APMS 2021 conference proceedings are organized into five volumes covering a large spectre of research concerning the global topic of the conference: "Artificial Intelligence for Sustainable and Resilient Production Systems".

The conference was supported by the International Federation of Information Processing (IFIP), which is celebrating its 60th Anniversary, and was co-organized by the IFIP Working Group 5.7 on Advances in Production Management Systems, IMT Atlantique (Campus Nantes) as well as the Centrale Nantes, University of Nantes, Rennes Business School, and Audecia Business School. It was also supported by three leading journals in the discipline: Production Planning & Control (PPC), the International Journal of Production Research (IJPR), and the International Journal of Product Lifecycle Management (IJPLM).

Special attention has been given to the International Journal of Production Research on the occasion of its 60th Anniversary. Since its foundation in 1961, IJPR has become one of the flagship journals of our profession. It was the first international journal to bring together papers on all aspects of production research: product/process engineering, production system design and management, operations management, and logistics. Many exceptional scientific results have been published in the journal.

We would like to thank all contributing authors for their high-quality work and for their willingness to share their research findings with the APMS community. We are also grateful to the members of the IFIP Working Group 5.7, the Program Committee, and the Scientific Committee, along with the Special Sessions organizers for their support in the organization of the conference program. Concerning the number of papers, special thanks must be given to the local colleagues who managed the reviewing process as well as the preparation of the conference program and proceedings, particularly Hicham Haddou Benderbal and Maria-Isabel Estrepo-Ruiz from IMT Atlantique.

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