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EDITORIAL

Quantitative approaches in production management

Stefan Helber[1] · Ton de Kok[2] · Heinrich Kuhn[3] · Michael Manitz[4] · Andrea Matta[5] · Raik Stolletz[6]

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Production management requires Operations Research models and methods for undertaking tactical decisions such as the optimal dimensioning of capacity during the design phase of production systems as well as operational decisions such as scheduling of operations facing dynamic demands that have to be met. Production companies, large-scale industrial ones as well as medium-size and small-lot producers aim at providing goods and services to the customers gain added value over the entire supply chain. The objectives are reducing costs and/or increasing revenues, benefits, and profits by optimizing the production infrastructure and the production processes. The consideration of uncertainties, scarce capacities, and many other constraints make production management a challenging task from the practical and the theoretical perspective.

This Special Issue of OR Spectrum is dedicated to Horst Tempelmeier who, after being in academia for more than 40 years, will retire as a Professor for Production Economics and Management at the University of Cologne. Horst has been active in quantitative production management in general (see Tempelmeier and Reith-Ahlemeier (2004); Tempelmeier (2002, 1997) for MRP/ERP issues) and in particular in the fields of (multi-level) lot-sizing under capacity restrictions and/or stochastic demand (see Copil et al. 2017; Tempelmeier and Copil 2016; Hilger et al. 2016; Tempelmeier and Hilger 2015; Tempelmeier 2013b, 2011a; Tempelmeier and Herpers 2011, 2010; Sahling et al. 2009; Tempelmeier and Buschkühl 2009, 2008; Tempelmeier and Derstroff 1996; Tempelmeier and Helber 1994) as well as the design of flow lines using queueing-model-based performance analysis (see Lagershausen et al. 2013; Manitz and Tempelmeier 2012; Tempelmeier 2003; Tempelmeier and Bürger 2001; Tempelmeier and Kuhn 1992; Tempelmeier et al. 1989). Furthermore, Horst is the author of a number of textbooks such as Tempelmeier and Kuhn (1993) and Tempelmeier (2011b), which significantly contributed to the teaching and the practice of quantitative production management.

We are honored to serve as guest editors of the special issue on quantitative approaches in production management. For four of us, Horst has been the or a main academic advisor. Andrea represents Horst's link to the SMMSO research commu-

✉ Michael Manitz
michael.manitz@uni-duisburg-essen.de

Extended author information available on the last page of the article

nity on stochastic models for manufacturing and service operations (Liberopoulos et al. 2010), and Ton stands for Horst's research on inventory control and dynamic lot-sizing (see Tempelmeier and Fischer 2018; Tempelmeier and Bantel 2015; Tempelmeier 2013a; Tempelmeier and Fischer 2010; Tempelmeier 2007, 2006, 2000, 1993, 1985). We thank Horst for fruitful and controversial academic discussions, for his guidance, and for his inspiration.

For this special issue, more than 30 papers have been submitted of which the following six papers have been accepted: Benda et al. (2019) present a machine-learning approach for minimizing the makespan in an hybrid flow shop with parallel stations, sequence-dependent setup times, and limited transport resources, and, hence, possible blocking. Briskorn and Zeise (2019) propose a cyclic production scheme for a make and pack production process under uncertain demand and capacitated storage. Hottenrott and Grunow (2019) show how flexible layouts of assembly lines instead of strong serially arranged ones may improve the efficiency under increasing product heterogeneity, especially in the automotive industry. Kloos et al. (2019) analyze optimization strategies for the allocation of scarce supply among different sales hierarchies under service-level constraints. Stadtler and Meistering (2019) present deterministic lot-sizing models with different service-level constraints whereby some measure turns out to be more or less appropriate. Tan (2019) reveals the optimality of a hedging policy in a make-to-stock environment via a Markov-chain model with continuous material flow.

We thank the authors and the reviewers for contributing to this special issue which we hope will foster the use of quantitative approaches in production management.

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Affiliations

Stefan Helber[1] · Ton de Kok[2] · Heinrich Kuhn[3] · Michael Manitz[4] · Andrea Matta[5] · Raik Stolletz[6]

Stefan Helber
stefan.helber@prod.uni-hannover.de

Ton de Kok
a.g.d.kok@tue.nl

Heinrich Kuhn
heinrich.kuhn@ku-eichstaett.de

Andrea Matta
andrea.matta@polimi.it

Raik Stolletz
stolletz@bwl.uni-mannheim.de

1 Institute of Production Management, Faculty of Economics and Management, Leibniz University Hannover, Königsworther Platz 1, 30167 Hannover, Germany

2 Department of Operations Planning Accounting and Control, Faculty of Industrial Engineering and Innovation Sciences, Eindhoven University of Technology, Atlas 4.401, 5600 MB Eindhoven, The Netherlands

3 Department of Business Administration, Economics Faculty Ingolstadt, Catholic University of Eichstätt-Ingolstadt, Auf der Schanz 49, 85049 Ingolstadt, Germany

4 Department of Production and Supply Chain Management, Faculty of Business Economics, Mercator School of Management, University of Duisburg/Essen, Lotharstr. 65, 47057 Duisburg, Germany

5 Department of Mechanical Engineering, Politecnico di Milano, Campus Bovisa Sud, via La Masa 1, 20156 Milan, Italy

6 Chair of Production Management, Business School, University of Mannheim, Schloss 68131, Mannheim, Germany