MIT-Zaragoza Speaker Series

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Zaragoza Logistics Center, Classroom
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Prescriptive Analytics in Operations Management and its Application to Capacity Planning

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Abstract:

Virtually all important problems in operations management (OM) have to be taken under conditions in which relevant parameters (e.g., demand for final products and services, machine failure rates, etc.) are uncertain. With the rise of affordable sensors, smart production equipment, advanced web-analytics applications and other systems for tracking customer behavior, companies have, or will have, access to vast amounts of data that, if appropriately used, can enhance decision making under uncertainty in OM. A conservative standpoint of many researchers is that this new (and potentially "big") data can be leveraged, e.g., through machine learning techniques, to better forecast uncertain inputs to OM's traditional optimization models. Recently, a number of researchers have taken a different stance and proposed new ("prescriptive analytics") approaches that integrate machine learning and optimization techniques to directly prescribe OM decisions from extensive data sets, without being concerned about forecasting, and without having to make any strong assumptions about the underlying probability distributions of uncertain model parameters. Although they share some common grounds with traditional models in OM, these prescriptive analytics approaches promise a paradigm shift in how OM problems are tackled.

In this talk we briefly review the concept of prescriptive analytics applied to OM problems, and present and discuss data-driven prescriptive analytics approaches for a complex real-world capacity management problem. We demonstrate the potential of our approaches based on a case study, and derive insights on how and when such approaches are particularly valuable.

About the Speaker:

Richard Pibernik received his doctorate degree from Goethe University in Frankfurt, Germany. From 2004 to 2007 he was a research affiliate at the Massachusetts Institute of Technology (MIT) and a Professor within the MIT-Zaragoza International Logistics Programme at the Zaragoza Logistics Centre in Spain. From 2007 to 2012 he was a Professor of Supply Chain Management at the EBS Business School in Wiesbaden, and from 2010-2012 Otto Mønsted Visiting Professor at Copenhagen Business School. As of 2012 Richard is a chaired Professor of Logistics and Quantitative Methods in Business Administration at the University of Würzburg. At the same time he is an Adjunct Professor at the Zaragoza Logistics Centre, Spain, and a Visiting Professor at the Malaysia Institute of Supply Chain Innovation. Both Zaragoza Logistics Center and the Malaysia Institute of Supply Chain Innovation are nodes of MIT's Global SCALE Network, an international alliance of leading-edge research and education centers dedicated to the development and dissemination of global innovation in supply chain and logistics.

Richard's research is focused on quantitative methods for supply chain and logistics management. In particular, he works on data-driven approaches to supply chain management that integrate machine learning and traditional optimization models in supply chain management, supply chain information systems, and integrated planning approaches. He currently heads a research group consisting of eight researchers that is dedicated to data-driven approaches in supply chain and operations management, and also works actively in research project addressing healthcare supply chains for developing countries.

Richard has published his research in numerous renowned international journals such as Management Science, Production and Operations Management, Naval Research Logistics, and has been responsible, as a principal investigator, for many projects that were funded by industry and public funding agencies. He received grants from public funding agencies (EU, German Research Foundation, and the Governments of Germany and Spain), and carried out projects with large corporations (e.g. Lufthansa, Alcatel-Lucent, SAP), consulting firms (e.g. McKinsey), and many SME's in Germany, Spain, and other countries. He is currently working with many companies in projects focused on data-driven supply chain management, supply chain analytics, and exploitation of big data in supply chain management.