

# Challenges for Managing Complexity in Industrial and Operations Management – A point of view from ICIEOM 2013

## Katja Klingebiel

University of Applied Sciences and Arts/Fraunhofer IML - Germany. Is a full professor at the University of Applied Sciences and Arts Dortmund in Germany. She studied applied mathematics and obtained her Doctoral Degree (Dr.-Ing.) at the Faculty of Mechanical Engineering, Technische Universität Dortmund. She worked several years at the University of Dortmund as a researcher and later postdoctoral fellow as well as in automotive consulting for the Fraunhofer Institute for Material Flow and Logistics. She has managed several national and international research projects. Her areas of expertise especially comprise logistics, supply chain management and business process reengineering.  
katja.klingebiel@fh-dortmund.de

## Adriana Leiras

Is assistant professor at the Industrial Engineering Department of Pontifical Catholic University of Rio de Janeiro (PUC-Rio, Brazil). Her undergraduate, master, and doctor's degrees in Industrial Engineering were obtained at PUC-Rio. As part of her doctoral program in Brazil, she took part of an exchange program at the University of Waterloo (Canada). In 2012 she was a post-doctoral fellow at the University of Sao Paulo with an exchange program at the University of Lugano (Switzerland). Her main research interests are operations management and planning of supply chains under uncertainty, especially in the context of humanitarian logistics. She has published in several international journals and conference proceedings.  
adriana.leiras@puc-rio.br

## Francisco Soares Másculo

Federal University of Paraíba – UFPB, Paraíba – Brazil is associate professor at the Federal University of Paraíba in Brazil. His undergraduate and master degrees in Industrial Engineering were obtained at the Federal University of Rio de Janeiro and he obtained his PhD at New York University. His areas of expertise cover the different fields of Ergonomics.  
masculo@gmail.com

## Abstract

This Special Issue of the Brazilian Journal of Operations and Production Management (BJO&PM) presents eight papers selected from the XIX International Conference on Industrial Engineering and Operations Management (ICIEOM 2013). The conference was held under the theme “Managing Complexity: Challenges for Industrial and Operations Management”. This introduction paper evaluates and summarizes the selected contributions characterizing SCM with a leading role in complexity management. The key topics emphasized in the eight papers of this special issue are supply chain performance management, non-profit organizations management, customer relationship management, business-to-consumer relationship, performance evaluation, disruptions, internationalization, geographical relocation, transparency, sustainable transportation, quality, and reliability.

**Keywords:** Supply chain management, geographical relocation, government transparency, performance evaluation, balanced scorecard, customer relationship management, sustainability, reliability, quality of working life.

## 1 Introduction

The XIX International Conference on Industrial Engineering and Operations Management (ICIEOM 2013), held in Valladolid, Spain, has again promoted research in the fields of operations management and industrial engineering. The conference has been shaped around the trends and topics that will drive complexity management in the next decades.

In the past, an enterprise could survive by operating with unique North American, European, or Pacific Rim business strategies (Bowersox et al., 2013). Today, every successful organization pursues an international or global business strategy. Nevertheless, as firms all over the globe enter the international market, business all over the world is characterized by raising product variety due to necessary localization, increased demand uncertainty and a raising segmentation of markets due to more competition and longer supply chains with more logistical documentation. Furthermore, the rapid pace of technological innovation drives adaptations in marketing and competitive strategies with an increasing frequency. This results in a short- to mid-term need for adaptation of supply chain processes and resources and a shortening of product life cycles. Thus, collaborative strategies are sought to hold or improve the performance and the efficiency of production and logistics processes (Klingebiel and Wagenitz, 2012). As a result, the complexity of production and logistics operations, i.e. the number and diversity of product variants, supply chain processes and partners, their interactions and the temporal change of the elements and relationships between these (Yi and Klingebiel, 2013), continues to rise for all involved organizations. Research has to provide concepts to manage these dispersed complex networks under conflicting objectives as well as uncertainty and risks.

This Special Issue of the Brazilian Journal of Operations & Production Management (BJO&PM) brings together some of the most significant papers addressing aspects of this issues presented at ICIEOM 2013.

## 2 Overview of the Special Issue Papers

The research conducted by Machado, “Supply Chain Management: Survey in the Brazilian Pharmaceutical Industry”, analyses the supply chain performance management of the pharmaceutical industry in Brazil according to SCOR (Supply Chain Operations Reference) Model. Taking five business processes in consideration (planning, procurement, producing, distribution, and return), a survey was conducted with ten pharmaceutical companies located in Goias, in the country Centre of Brazil. The results indicate that competition takes place between companies and not between supply chains; very little integration occurs between their links, but wrapped in operational information such as quantity and time, than in relation to strategic issues such as planning along the chain. The research findings indicated gaps between the supply chain management model practiced by the pharmaceutical industry in Brazil and the SCOR reference model and the needs for improvement of this industry.

Souza and Rachid’s paper, “Internationalization and Geographical Relocation of Brazil’s Auto Parts Industry”, analyzes the denationalization and geographical relocation process of Brazil’s auto parts industry. A survey conducted with industry associations, specialized publications, and information from the authors’ previous research projects were employed to analyze the relationship between automakers and their suppliers. The authors concluded that Brazil’s auto parts industry

has experienced a process of denationalization in its international restructuring, which has led to its inclusion in discussions on deindustrialization phenomenon and caused significant changes in production management and the relationship between the companies. At the same time, the entry of new investments from automakers has changed the geographic location of this industry in Brazil, followed by the auto parts industry.

A research group from Fluminense Federal University - Rio de Janeiro, Brazil (Santos, Quelhas, França, Meirino, and Zotes) presents a literature review on transparency in government institutions in the paper entitled “Transparency in Government Institutions: A Literature Review”. The review was conducted through a bibliometric survey to explore and evaluate government transparency with regard to Brazil as well as international spheres. The authors, then, developed a theoretical framework that could guide the development of future research. The study suggests for future research an investigation on the impact of corruption in government that lacks transparency.

In the paper by Maciel, Maruyama, and Castanheira, “Issues and Trends on Sustainable Transportation: The Case of Brazilian Cities (2003-2010)”, external costs and urban transportation tendencies in Brazil are presented. Brazilian transport system accounts for negative externalities in terms of energy consumption, carbon dioxide and local pollution emissions, social costs, and infrastructure costs which results in unsustainable mobility system. Brazilian cities continuous expansion has also increased the need for passenger mobility and social improvements which has led to exponential increments on external transport system costs. Based on documental and literature research, the authors concluded that the significant increase in public infrastructure costs caused excessive energy consumption in recent years.

They state that that sustainable transport system in Brazil relies on public transportation.

The research conducted by Lutfi Júnior, Viegas Queiroz, Hékis, Pereira Queiroz, Lima, and Furukava, “Management Non-Profit Organizations: An Assessment of Performance Through the Balanced Scorecard”, focus on performance indicators and how they are evaluated and monitored by the Association field communities support – AACC (a non-governmental non-profit association located in Natal, Rio Grande do Norte, Brazil). The performance measurement of the non-profit association was evaluated by the successful implementation of the organizational strategy, considering Balanced Scorecard (BSC) methodology. The main results of the proposed approach refer to evaluation of overall scores for each dimension of the BSC methodology: financial, customer, internal processes, learning, and growth. The authors concluded that the findings could help the organization to review its strategy and to adopt management methods more accurately. Their management model can be adapted to other nonprofit organizations with the goal of creating measures and standards to conduct sustainable projects.

In the paper by “Validation of a CRM Scale for the B2C Market: Exploratory Factor Analysis”, Demo developed a valid scale for Customer Relationship Management (CRM) in the business-to-consumer (B2C) market, where demands for convenience, customization and long-term relationships are increasing. The scale was applied to a case study considering a sample collected online for American customers. This research can be considered as a starting point to provide a comprehensive valid measure of customer relationship management based on customers’ perspectives in order to provide superior organizational outcomes.

Pereira et al. focus in their article on the risk of gas turbines disturbances within a thermoelectric unit. The industrial organization involved

in this work is the Thermoelectric Power Plant Rômulo Almeida (TPP-RA). An approach is presented that implements a fuzzy inference system for fault prediction. Therefore, the authors applied a pattern recognition methodology on historical data from a use case information system to extract the knowledge which allows to predict the failure probability in given situations. These patterns have been used to implement a Fuzzy Inference Systems (FIS) as operational decision support tool to predict failures in the turbine in real time operation. It is shown that this system efficiently empowers managers to deal with the complexity of fault prediction in order to avoid costly implications for both the plant as well as the power consumers.

Barcelos and Freitas analyze in their article the quality of working life in the banking sector. Quality of working life, i.e. satisfied employees, can be considered as a significant driver for effective processes and consequently improvement of company profitability. The authors have developed a hybrid evaluation model has been based on existing models and scientific studies which has been applied in a municipality of the state of Rio de Janeiro, Brazil. To assure the reliability of the questionnaire Cronbach's alpha and item-to-total correlations analysis were conducted. A Mann-Whitney U test was applied to examine the differences according to perception of male and female workers. Furthermore, quartile analysis helped to identify the most critical issues influencing the quality of working life in general. The results of this work help to understand the dynamics and influences on profitability resulting from socio-economic aspects.

### 3 Final Remarks

The eight papers presented in this special issue provide an interesting contribution to the research

field of complexity management in Industrial and Operations Management by offering a broad look at key challenges for practitioners and academic researchers. The papers promote stimulating reading on production research, operations management, and industrial engineering for different audiences. BJOPM readers can find new perspectives and empirical contexts into several research areas of Supply Chain Management.

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