
Editorial

Ritesh Kumar Singh

Department of Production Engineering,
Birla Institute of Technology Mesra,
Ranchi-835215, India
Email: riteshsingh@bitmesra.ac.in

Lyes Benyoucef*

INRIA Nancy–Grand Est,
ISGMP - Bat. A, Ile du Saulcy,
57045 Metz, France
Email: lyes.benyoucef@inria.fr
*Corresponding author

Biographical notes: Ritesh Kumar Singh is Associate Professor in Birla Institute of Technology, Ranchi, India. His PhD dissertation is concerned with waste minimisation strategies in manufacturing industries. He did post-doctoral research at INRIA Nancy, France. His research interests include supply chain management, decision support systems, continuous improvement philosophies like lean manufacturing, TOC, Six Sigma, etc. He has developed diverse decision support heuristics to resolve the complex issues of industrial engineering. He has authored nearly 40 technical papers in peer-reviewed journals, and international conferences. His contributions have appeared in various reputable journals such as *IJPR*, *IJAMT*, *PPC*, *AEI*, *JEM*, *EAAI*, etc.

Lyes Benyoucef received his PhD in Operations Research at the National Polytechnic Institute of Grenoble, France, in 2000 and his HDR (Research Director Thesis) degree from the University of Metz, France, in 2008. He is a senior researcher (CR1-HDR) at INRIA. His main research interests include modelling and performance evaluation; and the simulation and optimisation of complex manufacturing systems and E-sourcing technologies. He is editorial board member of *International Journal of Services Operations and Informatics*, *International Journal of Business Performance and Supply Chain Modeling* and *Journal of Operations and Logistics*. He has also served on programme committees of many international conferences.

1 Introduction

Recent years have seen high levels of turbulence; companies that were market leaders a decade ago have in many cases encountered severe reversals of fortune. Rapid advances and complexity in technology, and the accompanying growing uncertainty in the business environment have brought about mergers and takeovers, and these have changed the shape of many markets. Traditional barriers between industries are breaking down. Inevitable, this has given to a very high level of competition and complexity. There is also a growing demand from the marketplace for ever-higher levels of service and

quality. In response for this changing business environment, there has been a search for an instrument that would offer a sustainable competitive advantage. In other words, companies are now seeking a position of superiority over competitors in terms of cost, product verity and customer satisfaction, etc. The emphasis in business has swung towards business strategies that have the creation of long-term customer loyalty as their central focus. Business leaders are pursuing new business paradigms that allow their companies to work to adapt to rapidly changing marketplace.

Service operations and logistics have become a critical aspect in today's fiercely competitive business environment. Under the expanded heading of logistics, service operations is now an integral part of company activities covering areas such as purchasing management, transportation management, production management, warehousing management, inventory management, etc. Today's consumers demand cheaper, high-quality products, on-time delivery and excellent after-sale services. Hence, companies are under intense pressure to cut product and material costs while maintaining a high level of quality and after-sale services. In 2002, US companies spent \$910 billion, or about 8.7% of the US gross domestic product (GDP), on business logistics systems, which contained the warehousing costs, transportation costs and logistic administration costs. In Singapore, the transport and communication industry sector contributed about 10.8% of the GDP in year 2003. Considering the importance and the influence of these challenges, manufacturers and retailers have paid great efforts to handle the flow of products efficiently and coordinate the management of supply chain smoothly.

2 Overview of the papers included in the special issue

We have encouraged authors to submit their papers with both theoretical and practical implications, with their results in service operations and logistics activities. Total nine papers were selected after a peer review process. These nine papers were revised in accordance with the suggestions and recommendations from the reviewers.

The first paper by Tarău, De Schutter and Hellendoorn discusses a hierarchical route control in Destination Coded Vehicles (DCV)-based baggage handling systems. In order to ensure the optimal routing of DCVs, a hierarchical control framework is proposed. In this framework, switch controllers provide position instructions for each switch in the network. The switch controllers are then supervised by a so-called network controller that mainly takes care of flows of DCVs. The routing control problem for the network controller is a nonlinear, mixed integer optimisation problem, with high computational requirements, which makes it intractable in practice. Therefore, the authors propose an alternative approach for reducing the complexity of the computations by approximating the nonlinear optimisation problem and rewriting it as a mixed integer linear programming (MILP) problem. For a benchmark case study, they compare the hierarchical route control with switch control approaches that have been developed previously. Results indicate that the proposed hierarchical control offers a balanced trade-off between optimality and computational efficiency.

The second paper by Fang, Huang, Qu and Zhang proposes an application framework for a real-time Complex Event Management System (CEMS) based on RFID (Radio Frequency Identification) equipments deployment. Through this way, all production data in manufacturing fields can be obtained in real time, and it improves the flexibility and responsivity to the changing market for the companies. Moreover, with the use of

complex event processing (CEP) technologies, CEMS aims to improve the manufacturing performance, efficiency and accuracy for enterprises through detecting and aggregating the actionable and meaningful information from large number of low-level primitive events captured from the RFID devices deployed in manufacturing shop-floor in real time. A case study is presented to illustrate the applicability of the proposed framework.

The third paper by Verma, Mishra and Singh presents analytical and simulation models to determine the performances of an FMS under various types of uncertainties. The aim of the paper is to perform scheduling of FMS under several types of machine breakdowns. The breakdown conditions are mainly classified into two types, i.e. machine breakdown due to chance causes (stochastic machine breakdown) and machine breakdown due to time-dependent causes, i.e. wear out of equipment (pre-determined machine shutdown). In particular, effects of machine flexibility on system performance are investigated under different breakdown conditions. A cooperative co-evolutionary algorithm namely symbiotic evolutionary algorithm (SEA) is used as a medium for all analysis. From different case analysis, it is found that as the flexibility level increases, the performance of FMSs improves in terms of minimisation of makespan.

The fourth paper by Potarusov, Allaoui, Goncalves and Kureychik deals with the one-dimensional Bin Packing Problem (1-D BPP). Exact solution methods can only be used for very small instances, hence for real-world problems, the paper focuses on heuristic methods. A Hybrid Genetic Algorithm (HGA) to solve 1-D BPP is developed and compared with the best existing algorithms in the literature. The performances of the HGA are discussed. The experimental results show that giving at least the same performance on term of quality solution; the HGA outperforms the existing algorithms on term of computational time. This performance is due to new mechanisms of hybridisation of genetic algorithms and local search considered in HGA.

The fifth paper by Kane and Baptiste deals with the newsboy problem and proposes a pedagogical approach for its teaching in engineer and business schools. In most cases, the studies focus on the optimal order quantity that maximises the expected revenue. In some cases, the studies target the expected cost itself, but never the associated risk. The paper considers the standard deviation of the expected cost for two classical models (including or not salvage revenue) and for three classical distributions (normal, uniform and exponential). The formulas can be drawn with any spreadsheet program and the student can evaluate the expected revenue and the risk associated with any ordering value. To illustrate the proposed formulas, numerical examples are given.

The sixth paper by Bensmaine, Benyoucef and Sari presents an 'intelligent' simulation tool with an embedded intelligent optimisation engine for solving various decision-making problems encountered during the simulation of a supply chain. Embedding an intelligent optimisation engine in a simulation tool allows precise evaluation of the performances of a supply chain and allows overcoming the lack of decision powers of traditional simulation tools. On the other hand, the combination of simulation and optimisation allows taking into account phenomena such as random events, business organisational issues and complex system dynamics that cannot be easily captured in an optimisation model. To illustrate the applicability of the tool, a simple example of a production-distribution network analysis is presented.

The seventh paper from Paviot, Lamouri and Cheutet presents a methodology to convert a Computer Aided Design (CAD) product structure to an Engineering Bill of Material (EBOM) product structure independently of the softwares used. They define an

UML data model that is implemented to provide an easy to use/deploy/maintain and low-cost bidirectional Computer Aided Design/Product Data Management (CAD/PDM) bridge. Basic features of collaborative design work are fully functional but still encounter problems to properly handle events sent by the CAD or the PDM when a modification occurs on either CAD or PDM sides. The implementation architecture and the numerical results obtained on different use cases are discussed proving the applicability of the developed methodology.

The eighth paper by Hammami, Frein and Hadj-Alouane deals with the supplier selection problem in a global context. The main aspects that characterise the global supplier selection problem are first identified. These aspects are: the emergence of transportation and inventory issues, the necessity of considering multiple buyers' sites and different time periods with dynamic parameters, etc. A two-phase global supplier selection approach is developed. The first phase of pre-selection uses a scoring method while the second phase of final selection is based on a mathematical optimisation model. The proposed mathematical model is multi-product, multi-buyer and multi-period. Several computational experiments based on a case study from the automotive industry are performed to illustrate the efficiency of the proposed approach.

The ninth paper by Belaid proposes a quantitative study of the risk surrounding the main problem of investment decision making in project portfolio selection. The primary objective is to provide managers with a decision support tool allowing them to choose carefully their investment strategies and reduce risk of failure. The developed tool consists of three major modules. The first module calculates projects cash-flow using a deterministic method. The second module, calculates expected after tax net cash flows and estimates performance indicators for each realization, thus yielding distribution of return for each project. The third module selects a set of projects (portfolio) using their covariance and semi-covariance matrix. The tool is applied to a portfolio of projects in petroleum upstream showing its applicability.

As mentioned the contributions cover both aspects of theoretical and practical development regarding the service operations and logistics. It is hard to draw precise conclusions and trends across the papers included in this special issue, but there is no doubt that the papers elaborate and refine many of the trends presented in the introduction of this note. As guest editors, we are satisfied with both the quality of the papers presented in this issue, and with the relevance on the themes we hoped to put focus on via this special issue.

Acknowledgements

We wish to place on record our special thanks to Editor-in-Chief Prof. Robin G. Qiu for his valuable guidance and support during the entire process of editing the special issue. We offer our thanks to the Inderscience editorial team for their active role and support. Finally, we wish to thank all reviewers for providing in-depth comments and constructive criticisms, and the authors for contributing their high-quality manuscripts.