Editorial

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Biographical notes: Elkafi Hassini is an Associate Professor at the DeGroote School of Business, McMaster University. He received a PhD and an MSc in Management Sciences from the Faculty of Engineering at the University of Waterloo. At the time of the writing of this editorial, he was a Visiting Professor in the Department of Systems Engineering at King Fahd University of Petroleum and Minerals in Saudi Arabia. In his research, he uses mathematical models and optimisation techniques to solve business decision problems. His current research focuses on the joint pricing and inventory management, logistics of e-tailing and supplier selection and procurement auctions.

1 Introduction

The Annual International Symposium on Supply Chain Management is held each fall to bring together researchers and practitioners from around the world. The highlights of the symposium include: a collection of high-quality academic papers, practitioner white papers or presentations, keynotes by renowned practitioners and academics and panel discussions on current topics. This special issue is drawn from the academic papers that were presented during the sixth symposium held from 15 October to 17 October 2008 and for the first time in Calgary, Canada.

One key aspect of the symposium is its goal to bring together academics and practitioners in one forum where they can share ideas and contribute to the advancement of the theory and practice of supply chain management. In addition to the interaction between academics and practitioners in the presentation and discussion panels, the symposium papers include contributions that span the spectrum of operations management methodologies from case studies and empirical work to quantitative and analytical studies. The papers in this special issue, one of two issues to be withdrawn from the 2008 symposium, highlight the analytical aspect of the symposium contributions. While they use different analytical methodologies, all the papers share a common theme: they develop optimisation models to solve different supply chain management problems.

Hassini (2008) has defined supply chain optimisation as "the most efficient use of resources that are involved in satisfying a customer order throughout a network of companies subject to restrictions and limitations on the use and flow of these resources". He has found that most current studies focus on optimising only a part of the supply

chain, something, that is, contrary to the spirit of supply chain management. The purpose of this special issue is to present studies that fill this research gap by presenting optimisation models that involve decisions and resources that extend beyond a single company.

2 The papers

There are five papers in this special issue. Table 1 provides a summary of the key features of the papers along three dimensions: methodology, supply chain issues that are discussed in the paper and contributions. In addition, some of the papers in this special issue address some of the topics that have been highlighted as emerging research opportunities in Hassini (2008). These include the papers by Rouf and Zhang, Salam et al. and Chaabane et al. that consider network-wide operations optimisation and green supply chain issues.

In the paper 'Supply planning for a closed-loop system with uncertain demand and return', Rouf and Zhang develop a non-linear programming model for a manufacturer who faces uncertain demand and returns and who has to decide on whether to buy or remanufacture products to satisfy its demand. They employ the model to look at practical what-if scenarios to provide helpful insight. For example, they find that increasing the remanufacturing capacity will add to the manufacturers' profits only up to a threshold.

In the paper entitled 'Optimising the design of a supply chain network with economies of scale using mixed integer programming', Salam et al. present a distribution network design problem where they consider non-linear transportation costs that reflect economies of scale. They apply linearisation techniques and use branch and bound to solve the resulting mixed integer linear programme.

Motivated by government regulations to reduce greenhouse gases emissions and businesses interest in understanding the impact of carbon markets on supply chains, Chaabane et al. develop a supply chain network design model to study the impact that different network configurations will have on carbon footprint. In their work entitled 'Trade-off model for carbon market sensitive green supply chain network design' they apply multi-objective mixed integer linear optimisation and consider the carbon footprint impact on different network decision factors such as supplier and subcontractor selection, product allocation, capacity utilisation and transportation configuration.

Table 1 Summary of key paper features

Authors	*Methodology*	*Supply chain issues*	*Contribution*
Rouf and Zhang	Non-linear programming	Sourcing and sustainable supply chains	A model and sensitivity analysis for a manufacturer, with uncertain market demand and return, who has to decide on whether to buy products or remanufacture them
Salam, Bandaly and Defersha	Mixed integer programming and linearisation	Distribution network configuration	A model for a distribution network with non-linear transportation costs

Table 1 Summary of key paper features (continued)

Authors	*Methodology*	*Supply chain issues*	*Contribution*
Chaabane, Ramudhin, Kharoune and Paquet	Multi-objective mixed integer linear optimisation	Distribution network configuration for green supply chains	Incorporation of carbon market issues in a supply chain design model that allows decision makers the ability to study the impact of different network configurations on carbon footprint
Khan and Jaber	Non-linear programming	Coordination inventory with imperfect quality in a two-stage multi-supplier and single-vendor supply chain	Developed closed form solutions for inventory polices for three coordination mechanisms and performed analysis on the effects of different costs on performance
Defersha and Chen	Mixed integer linear programming and genetic algorithms	Delivery scheduling	Developed a genetic algorithm procedure for solving delivery problems when lot sizes may vary

In the paper 'Optimal inventory cycle in a two-stage supply chain incorporating imperfect items from suppliers', Khan and Jaber consider a two-level supply chain with one vendor and multiple suppliers. The vendor orders components from the supplier who may ship with a known fixed percentage of defective items. The authors looked at three different coordination mechanisms for order sizes and frequencies between the vendor and the suppliers. They find that the policy that calls for the suppliers' cycle time to be taken as an integer multiplier of the vendor's cycle time performs better in practice. In addition, they performed an analysis of the effect of the different costs on the overall performance of the supply chain.

In their paper 'A genetic algorithm for *one*-job *m*-machine flowshop lot streaming with variable sublots', Defersha and Chen develop a genetic algorithm procedure to solve a delivery scheduling problem when lot sizes may vary. They numerically show that their method produces solutions in a reasonable time and that the variable lot size solutions perform better than the consistent or constant lot size alternatives.

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Reference

Hassini, E. (2008) 'Supply chain optimization: current practices and overview of emerging research opportunities', *INFOR*, Vol. 48, No. 2, pp.93–96.