Intelligent Decision Support for Logistics and Supply Chain Management

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Information and communication technology (ICT) is here to stay as a most important part of successful supply chain management (SCM). Intelligent decision support for logistics and SCM is now intertwined with decision analytics and continues to integrate with related disciplines like operations research, industrial engineering and information systems, just to name a few. And still, despite the influence of big data, cloud computing, and alike, there is a quest for more data, and they need to be correct. This sounds trivial but is yet to be achieved on a larger scale.

Linking intelligent information management to decision analytics and intelligent decision support systems also means that we have to constantly observe changes and possibly react, but also be proactive, regarding these changes, let them be on the ICT side, the modeling side, or the algorithmic side. With this we also again observe advances in the field of computational logistics; see e.g. [1], [2] and related contributions.

This year, our minitrack consists of five papers dealing with intelligent decision support in the field of logistics and SCM. The papers range from specific logistics problems to general issues of ICT influences on companies. In addition, we provide an Open Forum on future perspectives of Intelligent Decision Support for Logistics and Supply Chain Management.

The first paper Strategic Decision Support for the Bi-objective Location-Arc Routing Problem considers a problem where facilities have to be located and routes must be determined simultaneously. To become more practical the interplay of two objectives minimizing total costs as well as minimizing delivery times for servicing required demands is investigated.

In the second paper Integrating Side Payments into Collaborative Planning for the Distributed Multi-Level Unconstrained Lot Sizing Problem a collaborative planning approach is used to coordinate the decisions of multiple, autonomous and self-interested agents. A neighborhood search is proposed to solve the problem. Side payments are introduced to compensate agents for accepting inferior solutions that direct the search to solutions with superior global costs. The paper is a presentation only paper with the published version available as [3].

Modular Modeling and Optimization of Temporal Manufacturing Processes with Inventories, the third paper, looks at inventory levels varying over time and being a function of the configuration settings of the production environments. Modular process components are proposed to represent these manufacturing environments at various levels of granularity for performing what-if analysis and decision optimization queries.

The fourth paper Supply Chain Capabilities and Information Technology Characteristics: Interaction Effects on Firm Performance investigates the effects of ICT on the performance of companies. The results of the study confirm significant moderating effects of ICT characteristics on the relationship between supply chain capabilities and firms’ market performance, while related effects on the relationship between supply chain capabilities and firms’ financial performance are less prominent.

A Mathematical Programming Model for Matching Sequential Activities in Logistics Systems with Tolerance for Erroneous or Missing Data, the fifth paper, provides a mathematical model constructed to match flight data from the FAA Air Traffic Control system with airline gates maintained by an individual carrier. This also focuses on data occasionally missing or imperfectly recorded.

References