



Centre of Excellence in Supply Chain Management

## Workshop on Logistics and Supply Chain Management

Louvain School of Management  
Université Catholique de Louvain

March 30<sup>th</sup>, 2007

Room **Urbain Vaes**, IAG building, Place des Doyens 1, Louvain la Neuve

### PROGRAM

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|---------------|---|---|
| 1200-1300 hrs | - | Lunch (for those able to make it by 12h00: please, advise beforehand)   |
| 1300-1305 hrs | - | Welcome, Per Agrell   |
| 1300-1345 hrs | - | <b>Xavier Brusset</b> , Per Agrell<br><i>“Supply chain cannibalization and coordination in distributed decision making units”</i><br>Centre of Excellence in Supply Chain Management<br>Discussant: <b>Jordan Srour</b>                     |
| 1345-1430 hrs |   | <b>Quentin Botton</b> , Bernard Fortz<br><i>“Extended Node-Arc Formulation for the K-Edge-Disjoint Hop-Constrained Network Design Problem”</i><br>Centre of Excellence in Supply Chain Management<br>Discussant: <b>unnamed</b>             |
| 1430-1515 hrs | - | <b>Jean-Sébastien Tancrez</b> , Pierre Semal, Philippe Chevalier<br><i>“Histogram based bounds and approximations for production lines”</i><br><i>Centre of Excellence in Supply Chain Management</i><br>Discussant : <b>Rommert Dekker</b> |
| 1515-1600 hrs | - | <b>Marco Bijvank</b> , Iris F.A. Vis, Ger Koole<br><i>“Quality-Driven Inventory Management at Hospitals”</i><br>Vrije Universiteit Amsterdam, Faculty of Sciences<br>Discussant: Yves Pochet  |
| 1600-1605 hrs | - | Break   |
| 1605-1650 hrs | - | <b>Chien Ming Chen</b> , Yeming Gong, René de Koster, Jo van Nunen<br><i>“DEA-based performance evaluation of order picking systems”</i><br>RSM Erasmus University Rotterdam<br>Discussant: <b>unnamed</b>                                  |
| 1650-1700 hrs | - | <b>René de Koster</b><br><i>Closing words, date for next seminar</i>  |

## **Summary of Abstracts**

### *Supply chain cannibalization and coordination in distributed decision making units*

Per Agrell, Xavier Brusset

#### **Abstract**

Supply chains may contain partially overlapping downstream segments to induce efficiency through competition or to maximize market coverage, e.g. national distribution on a centralized physical production and distribution organization. We study the cannibalization and coordination problem in partially overlapping distribution channels within the same organization through control of the diversity in process definitions as to avoid free-riding and other incentive problems. An agency model is used to derive some policy findings. A case based on the interactions between a parapharmacy retailer and a cosmetics manufacturer in Europe is presented..

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### *Extended Node-Arc Formulation for the K-Edge-Disjoint Hop-Constrained Network Design Problem*

Quentin Botton, Bernard Fortz

#### **Abstract**

This paper considers the K-edge-disjoint hop-constrained Network Design Problem (HCNDP) which consists in finding a minimum cost subgraph such that there exists at least K-edge-disjoint paths between origins and destinations of demands, and such that the length of these paths is at most equal to a given parameter L. This problem was considered in the past using only design variables. Here, we consider an extended node-arc formulation, introducing flow variables to model the paths. We conjecture that our formulation leads to the complete description of the associated polyhedron and we provide an algorithm leading to good performances in terms of computing times.

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### *Histogram based bounds and approximations for production lines*

Jean-Sébastien Tancrez, Pierre Semal, Philippe Chevalier

#### **Abstract**

We present a modeling method for the analysis of production lines with generally distributed processing times and finite buffers. We consider the complete modeling process, from the data collection to the performance evaluation. First, the data about the processing times is supposed to be collected in the form of histograms. Second, tractable discrete phase-type distributions are built. Third, the evolution of the production line is described by a Markov chain, using a state model.

Our originality mostly comes from the way the phase{type distributions are built: the “grouping at the end” discretization aggregates the probability mass in a time step at its end. The method allows to compute refinable upper and lower bounds on the throughput. Furthermore, we propose some approximations and show how the method performs on simple examples. We argue that the way the distribution are discretized, called “probability masses fitting”, can be thought as a valuable alternative in order to build tractable distributions.

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### *Quality-Driven Inventory Management at Hospitals*

Marco Bijvank, Iris F.A. Vis, Ger Koole

#### **Abstract**

We consider the problem of inventory management for medical items at hospitals. The objective is to find a balance between desired service and inventory levels. In this way high-quality health care can be provided at all times and inventory costs and storage spaces can be limited. We develop a lost-sales service-based (R,s,Q) inventory model with a capacity constraint to represent the replenishment problem at hospitals. To overcome the problem of exhaustive computation times we construct a heuristic approach and a spreadsheet-based inventory rule to determine near optimal values for the safety stock and the order quantity. The spreadsheet-based inventory rule provides solutions for hospitals that differ less than 1% from optimal solutions. Numerical experiments and a case study clearly demonstrate both the accuracy and the applicability of our approach.

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*DEA-based performance evaluation of order picking systems*

Chien-Ming Chen, Yeming Gong, René de Koster, Jo van Nunen

Abstract

The warehousing literature on order picking mostly considers single objective, whereas in practice warehouse managers usually have to look beyond unidimensional performance. Although numerous approaches have been proposed to optimize individual objectives, there is no clear guideline about how to select portfolios of order picking policies from a multi-axial and contextual perspective. In this paper, we employ Monte Carlo simulation to derive the cost-related and service-related performances of order picking systems adopting different combinations of order picking policies. Data Envelopment Analysis (DEA) is then used to evaluate the performances of these order picking systems based on short-term or long-term considerations. We expect to offer a set of practical recommendations as for under which condition, which combination of order picking policies should be adopted to enhance the system performance. This paper is one of earliest studies that evaluate the integral performance of order picking systems with different combinations of order picking policies.