

MSOM Supply Chain Management SIG 2009 Conference

Pushing the Frontier: Research Collaborations between Industry and Academia in Supply Chain Management

This workshop will focus on recent operations and supply chain management research work which has been selected for its industrial impact. Each project will be jointly presented by a contributing faculty from a recognized university and a representative of the firm which implemented the research, followed by an open Q&A and discussion session. This event has been designed for:

- Industry practitioners and consultants seeking to expand their awareness of cutting-edge practices by leading firms in supply chain management;
- Academic researchers seeking exposure to new problems that are relevant to industry;
- Individuals from industry and academia interested in solving important concrete problems through research collaborations of this type.

Selected Collaborations

- IBM and the University of Michigan, Stephen M. Ross School of Business
- Procter & Gamble and Boston University School of Management
- Deloitte and Northwestern University, Kellogg School of Management
- Zara, UCLA Anderson School of Management and MIT Sloan School of Management
- Yedioth Information Technologies and Technion— Israel Institute of Technology
- Caterpillar and Carnegie Mellon University, Tepper School of Business
- Just Born Candy and Lehigh University, Industrial and Systems Engineering

Registration and Hotel: Further registration and hotel information can be obtained from the website:
<http://mitsloan.mit.edu/omg/msom2009/>

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IBM Research

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8:00-9:00 am



Modeling Price Protection Contracts to Improve Distribution Channel Performance in IBM's Extended Server Supply Chain

Markus Ettl (IBM, Supply Chain Analytics and Architecture)

Roman Kapuscinski (University of Michigan, Stephen M. Ross School of Business)

In North America, over 70% of IBM's high-velocity servers are sold through major channel partners such as Arrow, Ingram, or Tech Data. Price protection is a widely-used marketing feature of IBM's contracts to help insulate channel partners against imminent price reductions. Price protection is what IBM reimburses to its channel partners whenever it reduces the price on products that channel partners are holding.

In this talk, we describe a channel collaboration solution that we developed for IBM's extended server supply chain, featuring a non-linear inventory model for optimized replenishment decisions under price protection and proactive alerting of critical inventory situations based on up-to-date inventory and sales information.

We discuss some of the problems facing the modeling team during the implementation of the system in IBM's server supply chain, and demonstrate the impact that the improved collaboration has had on IBM, on channel partners, and the broader supply chain performance.

9:15-10:15 am



Global Dual Sourcing: Tailored Base Surge Allocation to Near and Offshore Production

Gad Allon (Northwestern University, Kellogg School of Management)

Cort S. Jacoby and Ruchir Nanda (Deloitte Consulting, Strategy & Operations/Consumer & Industrial Products)

When designing a sourcing strategy in practice, a key task is to determine the average order rates placed to each source because that affects costs and supplier management.

We consider a firm with access to a responsive near-shore source (e.g., Mexico) and a low-cost offshore source (e.g., China). We analyze a tailored base-surge (TBS) sourcing policy that is simple, used in practice, and captures the classic tradeoff between cost and responsiveness. The TBS policy replenishes at a constant rate from the offshore source and produces at the near shore plant only when inventory is below a target. The constant base allocation allows the offshore facility to focus on cost efficiency while the nearshore's quick response capability is utilized only dynamically to guarantee high service. We determine the allocation of demand into base and surge capacity, estimate corresponding working capital requirements, and identify and value the key drivers of dual sourcing.

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10:30-11:30 am

Z A R A Clearance Pricing Optimization at Zara

Felipe Caro (UCLA Anderson School of Management)

Jérémie Gallien (MIT Sloan School of Management)

Rodolfo Carboni (MIT LFM/Zara Inditex)

Spain-based retailer Zara is known for its fast-fashion strategy involving continuously changing assortments, small production batches, and minimal promotions. Its clearance pricing problem is thus unique and particularly challenging because it involves comparatively more different articles of unsold inventory with less price data points than other retailers.

Until 2007, Zara used a manual and informal decision-making process for determining price markdowns. In collaboration with Zara's pricing team, we have designed an alternative process relying on a formal forecasting model feeding a price optimization model. In this talk we will describe both models and present the results of a controlled field experiment conducted in all Zara stores in Belgium and Ireland during the 2008/09 winter season in order to test the new pricing method. Based on these results, Zara is planning to deploy this new process worldwide in the coming year.

11:30 am – 1:00 pm Lunch

1:00-2:00 pm

CATERPILLAR® Supporting a Bundling, Lane and Price Sheet Strategy for a Fortune 500 Industrial Manufacturer

Giulio Fenu (Caterpillar, Building Construction Products Division)

Sridhar Tayur (Carnegie Mellon University, Tepper School of Business)

One of the most exciting decisions in a Fortune 500 company is the setting of the annual price sheet: what products are to be sold, in what bundles, at what price and at what quoted lead times. The trade-off is increased revenue through more appropriate segmentation, product availability and pricing that more than off-sets the costs of increased complexity due to variety. A multi-year collaboration between Caterpillar, SmartOps and CMU has helped in the setting of the price sheet.

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2:15 – 3:15 pm



Pool Points for Peeps: A Network Optimization Model for a Candy Supply Chain

Alan Sargent (Just Born Candy, Supply Chain/Logistics)

Lawrence V. Snyder (Lehigh University, Industrial and Systems Engineering)

We introduce a model for optimizing transportation modes (direct vs. LTL), distribution center locations, truck routing, and the timing of shipments throughout a supply chain. Our model is motivated by and applied to a network optimization problem faced by the candy company Just Born, which produces marshmallow Peeps, Mike and Ike, and several other well known brands.

The problem at hand has elements of facility location, vehicle routing, and fixed-charge network design problems but cannot be cast as a special case of any of these. Instead, we formulate the model as a mixed-integer programming (MIP) problem and introduce several valid inequalities that strengthen the LP relaxation. We present computational results on real-world instances and discuss the qualitative results suggested by the solution. We also discuss how we overcame some of the data and modeling challenges that arose in translating the real-world supply chain problem into a mathematical model.

3:30 – 4:30 pm



The Paper Reel Supply Chain: An RFID-Enabled Information-Rich Approach

Assaf Avrahami (Yedioth Information Technologies)

Yale T. Herer (Technion – Israel Institute of Technology, Industrial Engineering)

In recent years the print industry has been facing constant and increasing competition from the double onslaught of the Internet and the proliferation of television channels. A key cost element in the print industry is paper, representing between 20% and 30% of total printing expenditures. Thus, any improvement in the operational efficiency of paper reel management has the potential of yielding considerable cost-savings. It is in this context that we analyzed the effect of enhancing the available paper reel supply chain information, through the use of semi active RFID technology. We focused on the printing house, carrying out a feasibility study as well as developing simulation models and formulas that forecast the savings from the augmented available information. Using standard economic evaluation techniques we unequivocally showed the economic imperative of introducing semi active RFID technology.

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4:45 – 5:45 pm



**Implementing the Guaranteed Service Model for Safety Stock Optimization at
Procter and Gamble**

Lydia Barrett (Procter & Gamble, Inventory Optimization)

John Neale (Boston University School of Management)

Sean Willems (Boston University School of Management and Optiant, Inc.)

The guaranteed-service model for safety stock optimization has been implemented at dozens of companies including Hewlett Packard, Intel, Kraft Foods, and Procter & Gamble. This talk will explain what has allowed this model to be successfully deployed and highlight some of the insights gained from deploying this model in practice. In particular, we will discuss the challenge of implementing inventory targets for production planning systems in the face of seasonal demand.

Many companies experience a severe drop in inventory and service as they transition from a high season to a low season. Kraft has termed this phenomenon the “landslide effect.” We will present real examples of the landslide effect and describe its causes by comparing common industry practice to the correct inventory mathematics for seasonal demand.

To ground the discussion, we will describe the implementation of a tactical inventory planning system at Procter & Gamble to support monthly safety stock planning. We will highlight the challenges of deploying a system like this on such a large scale.