### Sessions for Friday, May 06

**Friday, 08:00 AM - 09:30 AM**

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
<th>Authors</th>
<th>Abstract</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-0685</td>
<td>Volume Guarantees in Global Health</td>
<td>Alexander Rothkopf, Lecturer, Universität Wuerzburg, Germany</td>
<td>Recently global health buyers granted volume guarantees to pharma manufacturers in an effort to reduce prices through competition and higher economies of scale. However, guaranteeing volumes affects market competition and new supplier entry in the future. Our analysis lends insights to policy makers into the optimal structure of such schemes.</td>
</tr>
<tr>
<td>065-1710</td>
<td>Optimal Patient and Provider Incentives in Resource-Constrained Humanitarian Healthcare Service Settings</td>
<td>Karthik V. Natarajan, Assistant Professor, University of Minnesota, United States, Mili Mehrotra, Assistant Professor, University of Minnesota, United States</td>
<td>We analyze how a budget-constrained humanitarian organization managing a healthcare service program should design incentives to the provider and patients to maximize program coverage. We explore how the incentives change with the service offered and operating environment. We also compare the optimal incentive scheme to incentive schemes used in practice.</td>
</tr>
<tr>
<td>065-1681</td>
<td>Effects of Subsidies through For-Profit and Not-For-Profit Newsvendors</td>
<td>Gemma Berenguer, Assistant Professor, Purdue University, United States, Qi Feng, Professor, Purdue University, United States, George Shanthikumar, Professor, Purdue University, United States</td>
<td>To encourage consumption of products that generate positive social, health, and environmental externalities, a sponsor may subsidize a for-profit or a not-for-profit firm. We analyze the effectiveness of purchase-based and sale-based subsidy programs for each type of firm when prices are exogenously and endogenously determined.</td>
</tr>
</tbody>
</table>

### Track: Humanitarian Operations and Crisis Management

**Chair(s): Gemma Berenguer**

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
<th>Authors</th>
<th>Abstract</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-0685</td>
<td>Volume Guarantees in Global Health</td>
<td>Alexander Rothkopf, Lecturer, Universität Wuerzburg, Germany</td>
<td>Recently global health buyers granted volume guarantees to pharma manufacturers in an effort to reduce prices through competition and higher economies of scale. However, guaranteeing volumes affects market competition and new supplier entry in the future. Our analysis lends insights to policy makers into the optimal structure of such schemes.</td>
</tr>
<tr>
<td>065-1710</td>
<td>Optimal Patient and Provider Incentives in Resource-Constrained Humanitarian Healthcare Service Settings</td>
<td>Karthik V. Natarajan, Assistant Professor, University of Minnesota, United States, Mili Mehrotra, Assistant Professor, University of Minnesota, United States</td>
<td>We analyze how a budget-constrained humanitarian organization managing a healthcare service program should design incentives to the provider and patients to maximize program coverage. We explore how the incentives change with the service offered and operating environment. We also compare the optimal incentive scheme to incentive schemes used in practice.</td>
</tr>
<tr>
<td>065-1681</td>
<td>Effects of Subsidies through For-Profit and Not-For-Profit Newsvendors</td>
<td>Gemma Berenguer, Assistant Professor, Purdue University, United States, Qi Feng, Professor, Purdue University, United States, George Shanthikumar, Professor, Purdue University, United States</td>
<td>To encourage consumption of products that generate positive social, health, and environmental externalities, a sponsor may subsidize a for-profit or a not-for-profit firm. We analyze the effectiveness of purchase-based and sale-based subsidy programs for each type of firm when prices are exogenously and endogenously determined.</td>
</tr>
</tbody>
</table>

### Track: Supply Chain Management

**Chair(s): John Gray**

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
<th>Authors</th>
<th>Abstract</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-0449</td>
<td>Regulatory Targeting or Organizational Attention? How Environmental Sanctions May Lead to Product Recalls</td>
<td>George Ball, Assistant Professor, Indiana University Bloomington, United States, Suvit Mohanty, Assistant Professor, Penn State University State College, United States, Ujjal Mukherjee, Assistant Professor, University of Illinois Urbana-Champaign, United States</td>
<td>We explore leading indicators of product recalls by examining relationships between infrequent EPA environmental sanctions and future voluntary or mandatory recalls. Voluntary recalls are used to test the presence of learning and attention across different functions while mandatory recalls are used to test regulatory information sharing and targeting error-prone firms.</td>
</tr>
<tr>
<td>065-0560</td>
<td>Organizational Learning from Product Recalls: The Role of Firm Disclosure of Quality Failure Sources</td>
<td>Tracy Johnson-Hall, Assistant Professor, College of William &amp; Mary, United States, David Hall, Assistant Professor, Wright State University, United States</td>
<td>Food product recalls are serious external quality failures and may negatively impact firm performance. However, firms may also learn from recalls and the degree of learning could be impacted by both the source of a recall as well as firm characteristics. We examine these learning effects using event study methods.</td>
</tr>
<tr>
<td>065-0916</td>
<td>Recovering from Product Recalls</td>
<td>Manpreet Hora, Associate Professor, Georgia Institute of Technology, United States, Hari Bapuji, Associate Professor, University of Manitoba, Canada, Aleda Roth, Clemson University, United States</td>
<td>We investigate the recovery from product recalls in the context of global supply chains by focusing on two factors: remedy type and collection entity. We use data from the toy industry over a sixteen-year period and apply two-stage estimation models. Our findings reveal insightful patterns of firms’ recovery strategies.</td>
</tr>
</tbody>
</table>
065-0169  The Impact of 3D Printing on Supply Chain Performance
Dara Schniederjans, Assistant Professor, University of Rhode Island, United States

This study provides empirical evidence regarding the impact of 3D printing on supply chain performance. Results suggest that both the use as well as the extent of use has a significant positive association with supply chain performance as long as there is full top management support.

065-1781  The Influence of a Firm’s Supply Base R&D and Commercialization on Firm Performance
Surya Pathak, Associate Professor, University of Washington Bothell, United States
Pradhot Sen, Professor, University of Washington Bothell, United States
James Miller, Associate Professor, University of Washington Bothell, United States
Jayanth Jayaram, Professor, University of South Carolina, United States

We show that firms with high R&D supply-bases have a higher impact of their R&D and commercialization on their performance than those with low R&D supply-bases. We find that R&D and commercialization spending affect both short and long-term performance yet these two inputs have a negative synergy.

065-1995  State of Voice Directed Warehousing
Guram Gopal, Professor, Illinois Institute of Technology, United States

The warehouse is the heart of the supply chain. Materials are shipped in and shipped out, much like blood is to the heart. Our study focuses on various aspects of voice-directed warehousing, including the problems it addresses, how it works, costs and benefits of VDW, and potential implementation challenges.

065-1418  Opportunity for Formal Supply Chain Management Practices within the Nonprofit Sector
Brian Fleming, Associate Professor, Bissett School of Business, Canada

Our survey-based research project investigates the presence of formal supply chain management (SCM) for-profit style practices within the Calgary nonprofit sector. The results indicate a lack of awareness and practices of formal SCM practices. The conclusions include more efficient and effective spending within the nonprofit sector applying for-profit SCM practices.

065-0101  Optimal Workload Management During a Physician's Shift in an Emergency Department
Zhankun Sun, Student, Haskayne school of business, Canada
Nan Liu, Assistant Professor, Columbia University, United States

Emergency department physicians can adjust their workloads to reduce patient handovers which raise safety concerns due to the discontinuity of care. We present a dynamic programming model to inform patient flow management during an ED physician's work shift. Case studies based on real data are also discussed.

065-1040  The Impact of Delay Announcements on Hospital Networks Coordination and Waiting Times
Jing Dong, Assistant Professor, Northwestern University, United States
Elad Yom-Tov, Researcher, Microsoft Research, United States
Galit Yom-Tov, Assistant Professor, Technion Israel Institute of Technology, Israel

We investigate the impact of Emergency Department delay announcements on the coordination within hospital networks using a combination of empirical observations and numerical experiments. We provide empirical evidence that patients do take delay information into account. We also analyze factors that affect the level of coordination.

065-1438  An Empirical Study of the Impact of Introducing Physician Assistants During Critical Care Consultations
Mor Armony, Associate Professor, New York University, United States
Carri Chan, Assistant Professor, Columbia University, United States
Yunchao Xu, Student, New York University, United States

Physician assistants (PAs) can be cost-effective alternatives to physicians, but there is limited understanding of the impact of PAs on patient care. Using data from a major urban hospital system, we utilize a difference-in-differences approach to estimate the effect of PAs as part of critical care consultations on patient outcomes.

065-1687  Steady-State Approximation for Discrete Queue in Hospital Inpatient Flow Management
Pengyi Shi, Assistant Professor, Purdue University, United States
Jim Dai, Professor, Cornell University, United States

We study a discrete-time queue that models the daily census in hospital inpatient wards. We use Stein's method to develop explicit formulas to approximate its stationary distribution and characterize the error bound. We numerically demonstrate that the approximation works remarkably well for systems with various sizes and load conditions.
We address the problem of minimizing the total cost associated with the planning and scheduling of multi-skilled physicians providing home health services. We solve a large-scale MIP model through branch-and-price, tested on random instances. Preliminary results indicate that the proposed approach addresses the problem efficiently.

065-1436  Scheduling Medical Residents
Amy Cohn, Associate Professor, University of Michigan, United States
William Pozehl, Research Associate, University of Michigan Ann Arbor, United States

Resident schedules heavily impact the quality of both training and patient care. In collaboration with clinicians at the University of Michigan Health System, we have developed optimization-based methodologies to automate and improve the traditionally manual process of schedule creation. We present our models and lessons learned.

065-1342  Obtaining the Fairest Resident Rotational Schedule: A Multi-Objective Approach
Ruben Proano, Associate Professor, Rochester Institute of Technology, United States
Akshit Agarwal, Student, Rochester Institute of Technology, United States

We provide a multi-stage and multi-objective approach to generate resident schedules for an internal medicine rotational program. A series of MIP problems and AHP are used to generate weekly and shift schedules that are "fair" and facilitate continuity of care.

065-0456  Annual Block Scheduling for Internal Medicine Residents with 4+1 Templates
Jonathan Bard, Professor, University of Texas Austin, United States
Zhichao Shu, Student, University of Texas Austin, United States
Douglas Morrice, Professor, University of Texas Austin, United States
Luci Leykum, Professor, University of Texas Health Science Center, San Antonio, United States

A number of Internal Medicine residency programs have adopted an "X+Y" template, where the resident spends X weeks on a rotation without clinic duty and then Y weeks in clinic. We address a "4+1" block scheduling problem in Internal Medicine at the University of Texas Health Science Center, San Antonio.

065-0600  First Response to the Fire of Valparaiso, Chile: Estimation of Optimal Emergency Stocks and Delivery Plans
Jose Olave, Student, Pontificia Universidad Catolica De Chile, Chile
Ricardo Giesen, Assistant Professor, Pontificia Universidad Catolica De Chile, Chile
Juan Herrera, Assistant Professor, Pontificia Universidad Catolica De Chile, Chile
Paula Repetto, Associate Professor, Pontificia Universidad Catolica De Chile, Chile
Miguel Jaller, Assistant Professor, University of California Davis, United States

Coordination problems and material convergence are evident in every natural disaster. This work analyzes the first response of authorities and emergency groups during the fire of Valparaiso. The goal is to estimate the aid demand to provide guidelines to improve the response and reduce the material convergence in future events.

065-1379  Motivating Factors of Material Convergence and Willingness to Change: The Case of Socks for Japan
Jose Holguin-Veras, Professor, Rensselaer Polytechnic Institute, United States
Trilce Encarnacion, Student, Rensselaer Polytechnic Institute, United States
Johanna Amaya, Student, Rensselaer Polytechnic Institute, United States
Diana Ramirez-Rios, Student, Rensselaer Polytechnic Institute, United States
Shaligram Pokharel, 

In order to gain insight into the motivation behind material donations, we surveyed the registered donors of the Socks for Japan campaign. The results have implications for humanitarian logistics, by understanding the motivation behind physical donations we provide the basis for policies that can influence a shift in donor behavior.

065-0520  Assessing Disaster Response Capabilities Using the Process Maturity Framework
Miguel Jaller, Assistant Professor, University of California Davis, United States
Nuris Calderon, Lecturer, Universidad Autonoma del Caribe, Colombia
Melissa Del Castillo, Lecturer, Universidad Libre, Colombia
Jose William Penagos, Associate Professor, Universidad Libre, Colombia
Diego Suero, Lecturer, Universidad Libre, Colombia

Using data collected in Colombia, we discuss the results in terms of the maturity levels for different factors that comprise the processes of: risk management and understanding, risk mitigation, and disaster management and response in a region. We put forward a number of achievable goals and key practices.

065-0316  Pricing and Quality Perception: Theory and Experiment
Rim Hariss, Student, Massachusetts Institute of Technology, United States
Georgia Perekis, Professor, Massachusetts Institute of Technology, United States
Wichinpong Sinchaisri, Student, Massachusetts Institute of Technology, United States
Yanchong Zheng, Assistant Professor, Massachusetts Institute of Technology, United States

We study how consumers' quality perception may be affected by price markdowns and how a firm should in turn optimize its pricing strategy. We experimentally elicit the relationship between consumers' perceived quality and prices and discounts. We then characterize the firm's optimal policy based on the relationship estimated from data.
065-0191  A Two-Dimensional Shelf-Space Optimization Model for Tilted Shelves  
Kai Schaal, Lecturer, Catholic University of Eichstätt-Ingolstadt, Germany  
Alexander Hübler, Professor, Catholic University of Eichstätt-Ingolstadt, Germany  
Heinrich Kuhn, Professor, Cath. University Eichstätt Ingolstadt, Germany  
Classical shelf-space models assume that customers only see the first visible unit of an item. Our model for tilted shelves (e.g. for fresh food) allows retailers to position items beside and behind each other. This optimizes the total shelf quantity, while considering space-elasticity effects and shelf space limitations.

065-0202  Maximizing Revenue through Two-Dimensional Shelf-Space Allocation  
Neil Geismar, Associate Professor, Texas A&M University College Station, United States  
Milind Dawande, Professor, University of Texas Dallas, United States  
B.P.S. Murthy, Professor, University of Texas Dallas, United States  
Chelliah Sriskandarajah, Professor, Texas A&M University College Station, United States  
We optimally allocate contiguous rectangular presentation spaces in order to maximize revenues. Applications include feature advertising displays, webpage advertising, and shelf space allocation in stores. A product's presentation may have a vertical as well as a horizontal component, so displays extend across multiple shelves for in-store presentations.

065-1033  Consumer Response to Social and Environmental Responsibility Disclosure  
Basak Kalkanci, Assistant Professor, Georgia Institute of Technology, United States  
Erica Plambeck, Professor, Stanford University, United States  
We study the consumer response to (1) information about the social and environmental impacts of a firm's product and (2) how the firm is helping its suppliers to reduce their impacts. We find that voluntary disclosure of impacts can increase consumer trust and willingness-to-buy.

065-1089  Social Learning from Buyer Reviews  
Rashmi Sharma, Student, Penn State University University Park, United States  
Mirko Kremer, Professor, Frankfurt School of Finance & Management, Germany  
Nicos Savva, Assistant Professor, London Business School, United Kingdom  
Yiagos Papanastasiou, Assistant Professor, University of California Berkeley, United States  
We study a market setting where consumers choose between alternative service providers with uncertain quality under social learning. Consumers learn about the providers' quality from their own (centralized regime) or other customers' (decentralized) service experiences. Using a laboratory study, we compare the actual and theoretical performance of the two regimes.

065-1543  Product Line Optimization with Quantity Discount and Logistical Costs  
Ahmed Ghoniem, Associate Professor, University of Massachusetts Amherst, United States  
Bacel Maddah, Associate Professor, American University, Lebanon  
We develop a model that optimizes assortment and pricing decisions under supplier quantity discounts and truckload-based logistical considerations. The model employs a maximum-surplus consumer choice model. Computational results are discussed along with managerial insights.

065-1586  Consumer-Centric Approach for Store-Wide Retail Shelf-Space Management  
Tulay Fılamand, Student, University of Massachusetts Amherst, United States  
Ahmed Ghoniem, Associate Professor, University of Massachusetts Amherst, United States  
Bacel Maddah, Associate Professor, American University, Lebanon  
We develop an optimization model for a store-wide retail shelf space allocation problem with the objective of maximizing impulse buying. The work is grounded in the examination of different customer segments for which shopping paths may be random, greedy or optimized. Computational results and managerial insights are presented.

065-0421  Two-Dimensional Cutting Stock Problem with Sequence Dependent Setup Times: Heuristic, Lower Bound & Application  
David Wuttke, Lecturer, Ebs Business School, Germany  
H. Sebastian Heese, Professor, Ebs Business School, Germany  
We study the consumer response to (1) information about the social and environmental impacts of a firm's product and (2) how the firm is helping its suppliers to reduce their impacts. We find that voluntary disclosure of impacts can increase consumer trust and willingness-to-buy.
In collaboration with a textile manufacturer, we study a two-dimensional cutting-stock problem with sequence dependent setup times and tolerances. We develop a sequential heuristic, demonstrate its near-optimal performance, and illustrate its ability to provide production schedules by applying it to problems of realistic size.

065-0475 Smoothed Schedules for Mixed-Model Assembly Lines in a High Uncertainty Environment: Analytics in Action
Christina Phillips, Student, 1979, United Kingdom
Konstantinos Nikolopoulos, Professor, Bangor University, United Kingdom

Participative analytics model development enables production smoothing and uncertainty reduction in a highly variable manufacturing environment. A stratified planning and scheduling hierarchy is studied during collaborative model development. The researcher/analyst is embedded in the organization necessitating action research framework for an iterative process of stochastic modeling, simulation, and visual analytics.

065-0565 Order Sequencing with Unreliable Forecasts to Minimize Cash Lead Time
Wenli Peng, Student, Université catholique de Louvain, Belgium
Philippe Chevalier, Professor, Université catholique de Louvain, Belgium

We consider a global supply chain with an overseas supplier sequentially serving multiple buyers. Our main contribution is to provide some analytical support to the managerial intuition that forecast errors are detrimental to the supply chain performance and that a more reliable buyer should be prioritized.

065-0751 Planning Assessment Centers: An MIP-Based Decomposition Heuristic
Tom Rihm, Student, University of Bern, Switzerland
Norbert Trautmann, Professor, Department of Business Administration, Switzerland

In an assessment center, candidates for job positions perform predefined tasks and are evaluated by assessors. The planning situation consists of scheduling the tasks and assigning assessors. The objective is to minimize assessment center duration subject to the constraint that candidates must be assigned specific tasks. Our MIP-based decomposition heuristic outperforms state-of-the-art methods.

Friday, 08:00 AM - 09:30 AM, Fuschia
Session: Networks and Innovation
Chair(s): Yingchao Lan

065-0399 An Empirical Investigation of Transaction Dynamics in Online Surplus Networks: a Complex Adaptive Systems Perspective
Suvarat Dhanorkar, Assistant Professor, Penn State University State College, United States
Yusoon Kim, Assistant Professor, Oregon State University, United States
Kevin Linderman, Professor, University of Minnesota, United States

This study empirically investigates an Online Materials Waste Exchange to understand how structural complexity and uncertainty influence exchanges between buyers and suppliers in the network. The results show that the buyer's search behavior, homophily with suppliers, and competition with other buyers influences exchanges on the network.

065-0512 A Project-Level Analysis of Value Creation and Appropriation in Open Innovation Projects
Tingting Yan, Assistant Professor, Wayne State University, United States
Stephan Wagner, Professor, Swiss Federal Institute of Technology Zurich, Switzerland

Filing an important literature gap on project-level value creation and appropriation, this study adopts a novel theoretical view: the behavioral view of the firm, to study how the task context influences value creation and appropriation in inter-organizational new product development (NPD) projects. We propose that project-level conflicts play a key role in explaining whether an uncertain task environment helps or hinders project-level value creation, an unsolved puzzle in the literature. Furthermore, we contribute to the inter-organizational collaboration literature by showing how the nature of the inter-organizational relationships moderates the association between project-level value creation and appropriation, another unanswered question.

065-1234 Situated Experience vs. Modularity: Effects on Distributed Project Work and Project Margin
Fabrizio Salvador, Professor, Instituto De Empresa, Spain
Juan Madiedo, Student, IE Business School, Spain

How can project-based firms protect project margins when customer requirements force them to create solutions that depart from their modular product architectures? We investigate this problem through an in-depth case study of a multinational engineering and manufacturing company, enriched by an embedded moderated-mediation analysis of a sample of 97 projects.

065-1626 Manage the Tension between Innovation and Confidentiality Protection: A Social Network Perspective
Yingchao Lan, Student, Ohio State University, United States

We investigate how firms manage their network position for better product innovation performances and confidentiality protection. Our results indicate that network position is positively associated with both outcomes, which is moderated by tie strength.

Friday, 08:00 AM - 09:30 AM, Gardenia
Session: Topics in Revenue Management and Pricing II
Chair(s): Xingwei Lu, Xuanming Su

065-0488 You Are Eligible for an Upgrade - A Critical Look at Standby Upgrades
Ovunc Yilmaz, Student, University of South Carolina, United States
Mark Ferguson, Professor, University of South Carolina, United States
Pelin Pekgun, Assistant Professor, University of South Carolina, United States

Standby upgrades, where the guest is only charged if the upgrade is available at the time of arrival, is one technique that has become increasingly popular in the hotel industry. Working on a data set from a major hotel chain, we analyze the linkage between guest attributes and hotel characteristics.

065-0906 Revenue Management and Optimal Design of Loyalty Programs
Xingwei Lu, University of Pennsylvania, United States
Xuanming Su, University of Pennsylvania, United States
Loyalty programs are very popular among service industries, such as airlines, where limited capacity is commonplace and revenue management is crucial. We study the interaction between loyalty programs and revenue management. Based on the classic Littlewood Model, we additionally reserve capacity for loyalty awards to study its impact.

**065-0971** Distribution-Free Pricing  
Hongqiao Chen, Student, Academy of Mathematics and Systems Science, Chinese Academy of Sciences, China  
Ming Hu, Associate Professor, University of Toronto, Canada

We study a monopoly pricing problem in which the seller only knows the first and second moments of the customer's willingness-to-pay distribution. We propose a pricing heuristic and show its worst-case performance bound. We then apply this result to the pure bundling problem.

**065-1535** Data-Driven Promotion Recommendations for Brick-and-Mortar Stores  
Anton Ovchinnikov, Associate Professor, Queens University, Canada

We describe the design and implementation of a hardware and software solution for real-time promotions in brick-and-mortar stores. Methodology, data, analysis, model predictions, implementation and validation in a large convenience store chain are discussed.

**065-0971** Distribution-Free Pricing  
Hongqiao Chen, Student, Academy of Mathematics and Systems Science, Chinese Academy of Sciences, China  
Ming Hu, Associate Professor, University of Toronto, Canada

We study a monopoly pricing problem in which the seller only knows the first and second moments of the customer's willingness-to-pay distribution. We propose a pricing heuristic and show its worst-case performance bound. We then apply this result to the pure bundling problem.

**065-0042** Trade-In Remanufacturing, Strategic Customer Behavior, and Government Subsidies  
Fuqiang Zhang, Professor, Washington University St Louis, United States  
Renyu Zhang, Student, Washington University St Louis, United States

We study the impact of remanufacturing under strategic customer behavior and government subsidies. We characterize the interaction between strategic customer behavior and trade-in remanufacturing, and identify the socially optimal government subsidy/tax scheme.

**065-0490** Product Acquisition Management - A Third Party Remanufacturer Perspective  
Akshay Mutha, Student, Penn State University University Park, United States  
Saurabh Bansal, Assistant Professor, Penn State University University Park, United States  
V.D.R. Guide, Professor, Penn State University University Park, United States

We examine various acquisition strategies for a third party remanufacturer (3PR). We develop a model for the 3PR's profit maximization problem and derive its structural properties. We apply our model using realistic data from a smartphone remanufacturer.

**065-0541** The Adverse Impact of Retailer-Established Trade-In Programs on Consumer Welfare  
Mohammad Ghuloum, Assistant Professor, Kuwait University, Kuwait  
Gilvan Souza, Professor, Indiana University Bloomington, United States

We analyze, both analytically and empirically, how retailer-established trade-in programs impact new consumer welfare. We show that consumer welfare increases with the establishment of secondary markets but decreases with the subsequent introduction of trade-in programs. Moreover, the increase in the new and used product prices adversely affects consumer surplus.

**065-0669** Tell Me What I Want: A Study of Dynamic Assortment Planning with Learning Consumers  
Dorothee Honhon, Associate Professor, University of Texas Dallas, United States  
Canan Ulu, Assistant Professor, Georgetown University, United States  
Yulia Vorobytseva, Student, University of Texas Dallas, United States

If consumers are learning about which product they prefer, how should the retailer design its assortment? We compare optimal assortment strategies when the retailer accounts for consumer learning and when he ignores it. We also quantify the value of collecting experience information from the consumers, such as product reviews.

**065-1161** Optimal Spending for a Search Funnel  
Goker Aydin, Associate Professor, Indiana University, United States  
Shanshan Hu, Assistant Professor, Indiana University Bloomington, United States  
Shengqi Ye, Assistant Professor, University of Texas Dallas, United States

If consumers are learning about which product they prefer, how should the retailer design its assortment? We compare optimal assortment strategies when the retailer accounts for consumer learning and when he ignores it. We also quantify the value of collecting experience information from the consumers, such as product reviews.
Sponsored search marketing has been a major advertising channel for online retailers. Not all customers finalize their purchase decision after their first search query. Instead, customers might take a path of keywords and clicks - a search funnel - to complete a conversion. Noting this behavior, we investigate a retailer’s optimal advertising budget allocation across keywords.

065-0429 Value of Service Investment for Online Retailers - Does It Pay Off?
Ruqi Hou, Student, University of Science and Technology of China, China
Yugang Yu, Professor, University of Science and Technology of China, China
René De Koster, Professor, Rotterdam School of Management, Netherlands

We use the effect that positive and negative online comments have on market sizes to measure the economic effect of leaving from the market because of an unsatisfactory purchase with a low value-for-money level. We take VFM level as a decision variable and establish Nash equilibrium to maximize the profit of the firm.

16 Friday, 08:00 AM - 09:30 AM, Kahill
Session: Analytics in Operations Management
Track: Information in Operations Management
Chair(s): Hyunwoo Park

065-1817 Integrated Analytics Framework for Business Ecosystem Dynamics
Hyunwoo Park, Lecturer, Georgia Institute of Technology, United States
Rahul Basole, Associate Professor, Georgia Institute of Technology, United States

We propose a computational framework for analyzing business ecosystem dynamics. Our research fuses simulation with data/process mining and information visualization techniques, enabling decision makers to generate and test hypotheses, gain insights, and communicate results effectively. We illustrate our approach using real-world examples based on a curated dataset from multiple sources.

065-1822 Startup Positioning in Global Entrepreneurship Ecosystems
Hyunwoo Park, Lecturer, Georgia Institute of Technology, United States
Raul Chao, Associate Professor, University of Virginia, United States

We provide a generalizable description of global entrepreneurship ecosystems with novel measures that capture a startup's position and organizational identity. Based on our dataset, we generate a set of hypotheses for both global entrepreneurship ecosystems and the startups within those ecosystems. We portray the ecosystems using network and cluster visualization.

065-1853 Visualizing the Startup Genome
Rahul Basole, Associate Professor, Georgia Institute of Technology, United States
Raul Chao, Associate Professor, University of Virginia, United States

Our study uses novel visual analytic techniques to analyze start-up activities. Specifically, drawing on an analogy from genetics, we aim to visualize what we refer to as the "Start-Up Genome" - a unique sequence of activities that defines and differentiates one start-up from another.

17 Friday, 08:00 AM - 09:30 AM, Lily
Session: Optimization in Logistics and Supply Chain
Track: Manufacturing Operations
Chair(s): Zhou Yong-Wu Yuanguang Zhong

065-1796 Advertising Cooperation Among a Manufacturer and Multiple Retailers: A Cooperative Game Approach
Zhou Yong-Wu, Professor, South China University of Technology, China
Xiao Dan, Lecturer, Guangzhou University, China
Yuanguang Zhong, Assistant Professor, South China University of Technology, China
Wei Xie, Associate Professor, South China University of Technology, China

We study issues of cooperation in advertising among one manufacturer and multiple retailers. Two practical problems are investigated via the cooperative game approach, where the coalition's characteristic values are indicated by associated optimal expected profits. We then provide two fair allocation policies of the expected total profits for implement.

065-1793 Spare Parts Provisioning Strategy for a New Product with Limited Service Life
Wei Xie, Associate Professor, South China University of Technology, China
Yuanguang Zhong, Assistant Professor, South China University of Technology, China
Zhou Yong-Wu, Professor, South China University of Technology, China

We study a parts stocking policy for a product with a finite service life. We focus on a new product that has a time-varying installed base, caused by stochastic sales and out-of-service units. Specifically, an effective multi-phase spare parts provisioning strategy is developed to support the repair service.

065-1794 Pooling and Allocation Policies to Deliver Differentiated Service
Yuanguang Zhong, Assistant Professor, South China University of Technology, China
Zhichao Zheng, Assistant Professor, Singapore Management University, Singapore
Mabel Chou, Associate Professor, National University of Singapore, Singapore
Chung-Paw Teo, Professor, National University of Singapore, Singapore

Inventory and capacity pooling strategies have been widely used in industries to match supply with demand. Using Blackwell's Approachability Theorem, we derive a set of necessary and sufficient conditions to relax the fill rate requirements to the inventory needed in a system with differentiated service requirements.

065-1795 Casualty Priority Assignment and Ambulance Dispatching in Mass Casualty Incidents
Qiming Gu, Student, City University of Hong Kong, China
Yanzi Li, Associate Professor, City University of Hong Kong, Hong Kong
Wenbin Zhu, Associate Professor, South China University of Technology, China
Providing timely treatment to casualties following disaster requires careful coordination of two critical resources: ambulances and medical facilities. The former can be modeled as a packing problem and the latter can be modeled as multiple queues. We also analyze the robustness of our approach under information uncertainty.

065-0063  **Something From Nothing: Financial, Operational, and Social Benefits of Needs-Based Free Healthcare**
Vikrant Vaze, Assistant Professor, Dartmouth College, United States
Srinagesh Gavirneni, Associate Professor, Cornell University, United States
Omkar Palshule-Desai, Assistant Professor, Indian Institute of Management Indore, India

Healthcare organizations operating in markets with significant wealth and income inequality are now offering relatively expensive services free to customers who are unable to pay. We evaluate the role of customer segmentation, service provider learning, and social welfare in enabling these organizations to achieve their financial, operational, and societal objectives.

065-0309  **Design of Financial Incentives for Maternity Care Safety and Quality**
Beste Kucukyazici, Assistant Professor, McGill University, Canada
Cheng Zhu, Student, McGill University, Canada

The number of Caesarian section operations has been increasing, exposing mothers and newborns to potential harm and a heavy economic burden. This growth raises some concerns for policymakers. We examine means of optimizing financial incentives in order to reduce the number of C-sections without sacrificing quality.

065-0509  **Incentive Programs for Reducing Readmissions when Patient Care Is Co-Produced**
Dimitrios Andritsos, Assistant Professor, HEC Paris, France
Christopher Tang, Professor, University of California Los Angeles, United States

In order to compare the effectiveness of three different hospital reimbursement schemes (Fee-for-Service, Pay-for-Performance, and Bundled Payment) in reducing readmissions, we develop a "health co-production" model in which the patient's readmission is "jointly controlled" by the efforts exerted by both the hospital and the patient.

065-0752  **Separate & Concentrate: Accounting for Process Uncertainty in the Design of Regional Hospital Systems**
Ludwig Kuntz, Professor, University of Cologne, Germany
Stefan Scholtes, Professor, Cambridge University, Great Britain
Sandra Sulz, Assistant Professor, Erasmus University Rotterdam, Netherlands

We show that the positive association between patient volume and service quality is stronger for patients with low process uncertainty, and that hospitals that route all patients in a disease segment to the same department have fewer department allocation errors and better outcomes, particularly for patients with high process uncertainty.

065-0396  **Styles in Product Design**
Tian Chan, Student, INSEAD, Singapore
Jurgen Mihm, Associate Professor, INSEAD, France
Manuel Sosa, Associate Professor, INSEAD, Singapore

We introduce an approach combining clustering techniques with experimental validation to identify styles (categories of designs similar in form) among 360,000 design patents. Using this platform, we find that turbulence (unpredictability of changes) in styles follows a U-shaped pattern to turbulence in functionality, and that style turbulence increases over time.

065-0746  **Turning the Tables: Contracts with Reciprocal Buyout Options**
Pascale Crama, Assistant Professor, Singapore Management University, Singapore
Niyazi Taneri, Assistant Professor, SUTD, Singapore

Joint Research and Development (R&D) allows firms to combine complementary capabilities, but is difficult to organize in the face of uncertainties surrounding the future product and skills needed to bring it to market. We analyze how contracts with mutual buyout options can help to organize joint R&D to mutual advantage.

065-1132  **Exploration and Exploitation with Knowledge-Sharing Under Competition**
Jennifer Bailey, Assistant Professor, Babson College, United States
Cheryl Gaimon, Professor, Georgia Institute of Technology, United States

We examine the incentives and disincentives for a firm to participate in knowledge-sharing with a direct competitor. We extend earlier game theoretic frameworks and consider how a firm's decision to participate in a knowledge-sharing partnership with a rival firm depends on the competitive regime under which the partnership exists.

065-1833  **Liquidity Cost of Portfolios**
Kai Yuan, Student, Columbia University, United States
Ciamac Moallemi, Associate Professor, Columbia University, United States
We develop a model to estimate the liquidity cost that allows for the trading of standardized liquid portfolios (e.g. ETFs). Several structural results on the drivers of liquidity are provided. Specifically, we show that in the "large universe" asymptotic regime, liquidity bids are purely driven by idiosyncratic risk.

065-1835  
Sourcing from Suppliers with Financial Constraints and Performance Risk  
Christopher Tang, Professor, University of California Los Angeles, United States  
Jing Wu, Student, University of Chicago, United States  
S. Alex Yang, Assistant Professor, London Business School, United Kingdom

We examine two financing schemes that enable suppliers to obtain financing: purchase order financing (POF) and buyer direct financing (BDF). While POF is as efficient as BDF in mitigating suppliers' moral hazard, it is less efficient when manufacturers possess superior information about suppliers and suppliers' asset levels are low.

065-1839  
Dynamic Budget Allocations in Operational Risk Management  
Yuqian Xu, Student, New York University, United States  
Michael Pinedo, Professor, New York University, United States  
Lingjiong Zhu, , ,

In this paper, we characterize the net present value of a financial firm with a classical Black-Scholes model, but taking into account operational risk losses, represented by a Compound Poisson process. We study optimal investments towards bank infrastructure that maximize the firm value and reduce the bankruptcy probability.

065-2002  
On Cash-Flow Based Dynamic Inventory Management  
Michael Katehakis, Professor, Rutgers University, United States  
Benjamin Melamed, Professor, Rutgers University, United States  
Jim (Junnim) Shi, Assistant Professor, New Jersey Inst of Technology, United States

We model a firm that can finance its inventory of identical items to meet non-stationary random demand while it earns interest on its excess cash. We review structure results of optimal policies, and efficient computational methods for measures of risk introduced by financing. We end with insights from numerical studies.

21 Friday, 08:00 AM - 09:30 AM, Poinsettia  
Session: Supply chain contracting and information  
Chair(s):  Bin Hu

065-0049  
Optimal Procurement in Assembly Supply Chains: Contracting Timing and Supplier Mergers  
Bin Hu, Assistant Professor, University of North Carolina Chapel Hill, United States  
Anya Qi, Assistant Professor, University of Texas Dallas, United States

OEMs typically assemble components from suppliers into final products, which calls for coordination in procurement. We propose two-part tariff contracts for assembly supply chain procurement, and find simultaneous and sequential contracting to be revenue equivalent. We further investigate the impact of a supplier merger in an assembly supply chain.

065-0443  
An Optimal Procurement Mechanism with Post-Bid Cost-Reduction Activities  
Qi (George) Chen, Student, University of Michigan Ann Arbor, United States  
Damian Beil, Associate Professor, University of Michigan Ann Arbor, United States  
Izak Duenyas, Professor, University of Michigan Ann Arbor, United States

We consider a procurement auction setting where the buyer may, after seeing the suppliers' bids, exert effort to identify cost-reduction opportunities with a subset of suppliers before selecting the contract winner. We characterize the optimal mechanism, along with the optimal cost investigation strategy, and study implications on suppliers' surplus.

065-0961  
Information Preferences in the Supply Chain Under Strategic Inventory  
Abhishek Roy, , McCombs School of Business, United States  
Stephen Gilbert, Professor, University of Texas Austin, United States  
Guoming Lai, , University of Texas Austin, United States

We investigate how strategic inventory influences preferences for information sharing between supply chain partners. Among other results, we show that the presence of strategic inventory may alter traditional information sharing preferences of supply chain partners.

22 Friday, 08:00 AM - 09:30 AM, Quince  
Session: Innovative Delivery Methods in Teaching Operations and Supply Chain Management Courses/Topics (Workshop)  
Chair(s):  Mark Davis  Ravi Behara

065-2054  
Innovative Delivery Methods in Teaching Operations and Supply Chain Management Courses/Topics  
Mark Davis, Professor, Bentley University, United States  
Ravi Behara, Associate Professor, Florida Atlantic University, United States

We present a variety of delivery methods in teaching Operations/Supply Chain Management courses and topics to help navigate today’s learning environment. These include service learning, undergraduate research, project-based learning, and interactive exercises. We propose a set of recommendations to help navigate the disruptions by adopting a “pragmatic liberal” approach.

23 Friday, 08:00 AM - 09:30 AM, Azalea  
Session: Managing Socially Responsible Supply Chains  
Chair(s):  Leon Valdes

065-0137  
Is Servicization a Win-Win Strategy?  
Adem Orsdemir, Assistant Professor, University of California Riverside, United States
Friday, 08:00 AM - 09:30 AM

065-0507 Milking the Quality Test: Improving the Milk Supply Chain
Liyung Mu, Assistant Professor, University of Delaware, United States
Milind Dawande, Professor, University of Texas Dallas, United States
Xianjun Geng, Associate Professor, University of Texas Dallas, United States
Vijay Mookerjee, Professor, University of Texas Dallas, United States

Deliberate adulteration by milk farmers has been prevalent in developing countries. Our goal is to provide recommendations that solve the adulteration problem with minimal testing. The novelty of our proposal lies in the use of mixed testing as well as competition to solve a problem created by competition.

065-0582 Investing in Supply Chain Transparency for Social Responsibility
Tim Kraft, Assistant Professor, University of Virginia, United States
Leon Valdes, Student, Massachusetts Institute of Technology, United States
Yanchong Zheng, Assistant Professor, Massachusetts Institute of Technology, United States

We study a manufacturer’s decisions when the social responsibility performance of his supplier cannot be perfectly observed. The manufacturer can invest to increase the transparency of its supply chain and the supplier’s performance. A third party may disclose social responsibility information to consumers, potentially affecting the manufacturer’s profits.

24 Friday, 08:00 AM - 09:30 AM, Begonia
Session: Data Analytics and Supply Chain Management
Chair(s): Xiuli He

065-1536 The Impact of CRM Software on Customer Shopping Behavior
Ram Janakiram, Associate Professor, University of South Carolina, United States
Joon Ho Lim, Student, Texas A&M University College Station, United States
Rishika Rishika, Assistant Professor, University of South Carolina, United States
Subodh Kumar, Professor, Texas A&M University College Station, United States

We empirically examine the impact of the implementation of product recommendation technology on customer behavior and supply chain analytics. Based on our results, we offer prescriptions for salespersons on how they can leverage product recommendation technology to engage with different customer segments.

065-1716 The Value of Express Delivery Services in EU Cross-Border E-Commerce
Thai Kim, Student, Erasmus University Rotterdam, Netherlands
Rommert Dekker, Professor, Erasmus University Rotterdam, Netherlands
Christiaan Heij, Assistant Professor, Erasmus University Rotterdam, Netherlands

We empirically examine the effect of express delivery services on success factors in cross-border e-commerce using data on forty-three thousand purchasing transactions from a consumer electronics manufacturer’s cross-border online shop. The findings indicate that express delivery significantly influences order incidence, order size, and repurchase rates in cross-border transactions.

065-1846 Supplier Satisfaction Measurement in Supply Chain: A PLS Approach
Purushottam Meena, Assistant Professor, New York Institute of Technology, United States
Rajen Tibrewala, Professor, New York Institute of Technology, United States
Gopal Kumar, Senior Lecturer, Dublin City University, Ireland

We developed a scale and model to measure a supplier’s satisfaction (SS) in a buyer-supplier relationship. We designed questionnaire and conducted a survey among 300 Indian companies. We used partial least squares (PLS) based structural equation modeling technique to validate the model and investigate the relationships of factors with SS.

25 Friday, 08:00 AM - 09:30 AM, Camellia
Session: Environmentally Responsible Operations
Chair(s): Michael Lim Karthik Murali

065-0599 The Impact of Ecolabeling on the Green Product Line
Karthik Murali, Assistant Professor, University of Alabama Tuscaloosa, United States
Michael Lim, Assistant Professor, University of Illinois Urbana-Champaign, United States
Nicholas Petruzzi, Professor, Penn State University State College, United States

The use of ecolabels allows firms to convey credible information about environmental attributes in their products to consumers. In a competitive setting, we study the role of a firm’s credibility and certification from external agencies on a firm’s ecolabeling choices and ensuing consequences from a triple bottom line perspective.

065-1514 A Bi-Objective Variable Neighborhood Search Algorithm for a Mixed-Fleet Green Vehicle Routing Problem
Mesut Yavuz, Associate Professor, University of Alabama Tuscaloosa, United States
Ismail Capar, Associate Professor, Texas A&M University College Station, United States

Adopting alternative-fuel vehicles (AFV) into a service fleet gives rise to a bi-objective mixed-fleet vehicle routing problem. We present a model incorporating internal and external refueling as well as AFV characteristics, including refueling speed, driving range, and refueling station availability. We develop a variable neighborhood search heuristic to solve large-scale problems efficiently.

065-0923 Capacity Investment Under Substitution, Material Reduction, and Recycling R&D
Aditya Vedantam, Assistant Professor, University of Buffalo, United States
Ananth Iyer, Purdue University, United States
Global concerns about the availability of metals such as dysprosium, used in clean energy technologies such as direct-drive wind turbines, have spurred various U.S. Dept. of Energy R&D projects. We develop a model with sequential direct drive capacity addition that provides an option value for these projects under progress in R&D milestones.

**065-1473** Strategic Commitment to a Production Schedule with Supply and Demand Uncertainty: A Renewable Energy Case
Nur Sunar, Assistant Professor, University of North Carolina Chapel Hill, United States
John Birge, Professor, University of Chicago, United States

How should a renewable power producer strategically commit to a production schedule in a day-ahead electricity market? How does this commitment affect the system reliability, day-ahead electricity price and production in equilibrium? To answer these questions, we introduce and analyze a competition model with demand and supply uncertainty via ODE theory.

**065-2062** Practice Leaders Semi-Plenary 1: Operational Challenges and Opportunities
Dirk DeWaart, Partner, Pricewaterhousecoopers, United States
Motz Feinberg, Executive Director, Supply Chain, Kaiser Permanente, United States
Ken Fordyce, Director of Analytics, Arkieva, United States

This session presents various operational challenges observed by practice leaders in management consulting, healthcare, and semiconductor industries respectively. Their views present research opportunities for OM researchers. Topics include best practices in service supply chains, workforce planning models in healthcare, and capacity planning in consumer and industrial products.
Session: Optimizing Humanitarian Response Capacity  
Chair(s): Jarrod Goentzel  

065-1591  Emphasize Prevention/Mitigation Instead of Response/Resiliency  
Willard Price, Professor, University of Pacific, United States

We examine system failures are not prevented, resulting in major disruptions. Others seek recognition for disaster response and study system resiliency rather than preventing human, facility and economic consequences. Our research brings attention to “Science of Prevention” from system development and decision methodology perspectives.

065-0665  Reacting to Crisis: The Costs and Capabilities of First Response by the United States Navy  
Aruna Apte, Associate Professor, Naval Postgraduate School, United States  
Keenan yoho, Associate Professor, Rollins College, United States

The United States Navy has responded to numerous disasters around the world. It is critical to understand the costs to better plan for maintaining the capability in a manner that is economically and operationally efficient. We identify the costs borne and explore an optimal mix of assets for such capability.

065-0519  Community Health Care Network Design in Remote Regions - The Case of Last Mile Health in Liberia  
Marlène Cherkesly, Student, CIRRELT, Université du Québec à Montréal, Canada  
Marie-Eve Rancourt, Assistant Professor, Universite Du Quebec A Montreal, Canada  
Karen Smilowitz, Associate Professor, Northwestern University, United States

In this paper, we design a community health care network for remote regions of Liberia. This study is a collaborative effort with Last Mile Health. We propose methods to increase health coverage in remote regions. We formulate the problem as a MIP with route variables. Computational results will be presented.

065-0641  Supply Chain Strategies in Humanitarian Logistics: A Review of How Actors Mitigate Supply Chain Risks  
Marianne Jahre, Professor, 1979, Norway

We aim to increase understanding of the use of supply chain strategies for improving responsiveness in the humanitarian context. Based on Tang’s (2006) robust supply chain strategies, we conduct a systematic review of published case studies in humanitarian logistics to classify risks and mitigation strategies used by humanitarian actors.

065-0217  Personal Protective Equipment (PPE) Supply Chains for Infectious Disease Outbreaks  
Emily Gooding, Student, Massachusetts Institute of Technology, United States  
Jarrod Goentzel, Lecturer, Massachusetts Institute of Technology, United States  
Marianne Jahre, Professor, 1979, Norway

Demand for personal protective equipment (PPE) for healthcare workers spikes during an epidemic outbreak, constraining supply and limiting humanitarian response. We utilize epidemiological modeling to improve PPE supply chains for outbreak response. Methods from supply chain management are applied to reduce the response time and the magnitude of an epidemic.

Session: Pricing and Revenue Management Applications  
Chair(s): Bora Keskin

065-1031  Pricing of Conditional Upgrades in the Presence of Strategic Consumers  
Yao Cui, Assistant Professor, Cornell University, United States  
Izak Duenyas, Professor, University of Michigan Ann Arbor, United States  
Ozge Sahin, Associate Professor, Johns Hopkins University, United States

We study a conditional upgrade strategy that is used by the travel industry. A consumer can accept an upgrade offer in advance and pay the upgrade fee at check-in if higher-quality products are still available. We characterize the firm’s optimal upgrade pricing strategy and identify multiple benefits of conditional upgrades.

065-1092  Dynamic Pricing with Correlated Demand: A Time Series Perspective  
Milashini Nambiar, Student, Massachusetts Institute of Technology, United States  
David Simchi-Levi, Professor, Massachusetts Institute of Technology, United States  
He Wang, Student, Massachusetts Institute of Technology, United States

We study a dynamic pricing problem where the seller faces time-correlated demand, represented by an ARMAX model with prices as exogenous inputs. We show structural results of the optimal pricing policy, and present a pricing algorithm which learns the parameters of the ARMAX model on the fly.

065-1351  Inventory Management and Pricing with Opaque Products  
Adam Elmachtoob, Assistant Professor, Columbia University, United States  
Michael Hamilton, Student, Columbia University, United States  
Yeqing Zhou, Student, Columbia University, United States

An opaque product is a product where the retailer hides one or more attributes of the product until after it has been sold. We discuss optimal policies for pricing and managing inventory under an opaque selling strategy. We also theoretically quantify the revenue and cost advantages of this strategy.

065-1609  Learning and Earning for Congestion-Prone Service Systems  
Philipp Afeche, Associate Professor, University of Toronto, Canada  
Bora Keskin, Assistant Professor, Duke University Durham, United States

Consider a firm selling a service in a congestion-prone system to price- and delay-sensitive customers. The firm faces Bayesian uncertainty about the consumer demand for its service and can dynamically make noisy observations on the demand. We characterize the structure and performance of the myopic Bayesian policy and well-performing variants.
### 065-0274 Co-Opetition in the Logistics Industry: Drivers and Barriers

Vahid Mirzabeiki, Assistant Professor, Cranfield University, United Kingdom  
Charles Stephens, Technical Director, NFT, United Kingdom  
Carlos Menéndez, Reader, Cranfield University, United Kingdom  

This paper aims to explore the concept of ‘co-opetition’, i.e. cooperation of competitor companies, for performing logistics operations, and to evaluate the drivers and barriers to its development in the UK logistics industry. Multiple case studies are used as the method for conducting this research.

### 065-0463 Middle-Market Firms and Supply Chain Integration: What, Why, and How

Matthew Schwieterman, Assistant Professor, Michigan State University, United States  
Johnny Rungtusanatham, Professor, Ohio State University, United States  
Thomas Goldsby, Professor, Ohio State University, United States  
WC Benton, Professor, Ohio State University, United States  
Martha Cooper, Emeritus Professor, Ohio State University, United States  

We use the focus group method to develop insights into supply chain integration within middle-market firms. Middle-market firms have revenues ranging between $10 million and $1 billion and are often "squeezed in the middle" between larger customers and larger suppliers.

### 065-0908 The Art of Disengagement: Exit Strategies in Manufacturing and Service Sector

Farooq Habib, Cranfield University, United Kingdom  

Our study marks one of the first attempts to empirically test the association between a coherent set of exit strategies and a combination of social and economic antecedents of exit. Given the under explored nature of the topic, the study also provides guidelines for further research.

---

### Session: Data Analytics in Healthcare  
**Chair(s):** Tinglong Dai  

#### 065-0247 Alternating Direction Methods for Large-Scale, Doubly Regularized Support Vector Machine

Minh Pham, Lecturer, University of Virginia, United States  
Anh Ninh, Assistant Professor, College of William & Mary, United States  

We introduce a new algorithm for the solution of the doubly regularized support vector machine. Numerical examples are presented for various gene expression data sets.

#### 065-0514 Clinical Ambiguity and Conflicts of Interest in Interventional Cardiology Decision-Making

Tinglong Dai, Assistant Professor, 1979, United States  
Xiaofang Wang, Associate Professor, Renmin University of China, China  
Chao-Wei Hwang, M.D. and Assistant Professor, Johns Hopkins Hospital, United States  

Coronary heart disease leads to one out of every six deaths in the United States. Yet decision-making in a catheterization laboratory, an indispensable segment of cardiology patient care, has not been well understood. Our study is the first such attempt and we consider both clinic and non-clinic factors.

#### 065-0628 Design of Appointment Templates with Time-Varying Walk-In Patients

Shan Wang, Student, Shanghai Jiaotong University, China  
Nan Liu, Assistant Professor, Columbia University, United States  
Guohua Wan, Professor, Shanghai Jiao Tong University, China  

Motivated by practice in, and data collected from, a large community health care center in New York City, we study the design of appointment templates with time-varying walk-in patients. We identify patterns of the optimal schedule, and provide easy-to-use heuristic solutions with closed-form performance bounds, shown to be tight in numerical studies.

#### 065-1594 Understanding System Stability and Performance in Addiction Health Services

Shiying Wu, Associate Professor, University of Southern California, United States  
Abdullah Alibrahim, Student, University of Southern California, United States  
Erick Guerrero, Assistant Professor, University of Southern California, United States  

There is limited knowledge of the addiction health services system's stability and client-centered performance. Our study analyzed multiyear data from 402 outpatient treatment programs in Los Angeles County. Statistical modeling identified differences among program performance measured by client completion rate and stability, based on client population size and transition paths.
We propose a comprehensive machine learning framework to capture the characteristics of members who repeatedly utilize Emergency Department (ED) services. We leverage supervised machine learning algorithms and sampling techniques for imbalanced datasets to identify frequent ED users based on their yearly insurance records, and provide recommendations to mitigate ED utilization.

065-0574  Learning, Predicting, and Visualizing Data-Driven Clinical Pathways From Data
Yiye Zhang, Student, Carnegie Mellon University, United States
Rema Padman, Professor, Carnegie Mellon University, United States

Digital innovations in healthcare service delivery are poised to dramatically disrupt current practices in healthcare operations and point-of-care decision making. We report on the use of machine learning algorithms to learn, predict, and visualize clinical pathways for management of chronic health conditions from highly granular electronic health record data.

065-0701  Measuring Policy Sensitivity Under Uncertain Conditions and Debatable Outcomes: Painful MDP's for Acute Pain Decision Support?
Ben Shickel, Student, University of Florida, United States
Parisa Rashidi, Assistant Professor, University of Florida, United States
Patrick Tighe, Assistant Professor, University of Florida, United States
Haldun Aytag, Professor, University of Florida, United States

Acute postoperative pain affects 80% of patients recovering from surgery. While Markov Decision Processes offer an objective approach to postoperative analgesic selection, identifying an optimal policy remains problematic due to conflicting treatment goals. We present a novel, patient-oriented approach to mapping policy sensitivities over a range of conflicting assumptions.

065-1957  Analyzing Process Defects Through Creation of a Database of Surgical Non-Routine Events
Paul St. Jacques, Associate Professor, Vanderbilt University, United States

Surgical processes are complex and varied. Improving the quality of these processes requires the analysis of numerous critical and non-critical events. We present the results of the creation of a computerized database which supports a high volume of data, auditing, reporting, and multiple participants of the quality improvement team.

<table>
<thead>
<tr>
<th>42</th>
<th>Friday, 09:45 AM - 11:15 AM, Salon 8</th>
<th>Track: Healthcare Operations Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair(s): Mohsin Malik</td>
<td>Session: Lean Implementations in Hospitals</td>
<td></td>
</tr>
</tbody>
</table>

065-0788  Effects of Quality Improvement Practices on Problem-Solving Behaviors: Application of Goal-Setting Theory
Yunsik Choi, Student, Clemson University, United States
Lawrence Fredendall, Professor, Clemson University, United States
Aleda Roth, Professor, Clemson University, United States

We use goal-setting theory to understand how managers can use lean operations methods to increase and improve their employees’ problem-solving practices (e.g., visual management). Furthermore, we examine how employees’ goal acceptance mediates employees’ involvement in achieving continuous improvement.

065-1255  Exploring Variability and Buffers in Lean Initiatives in Health Care
Oskar Roemeling, Student, Rijksuniversiteit Groningen, Netherlands
Martin Land, Associate Professor, University of Groningen, Netherlands
Kees Ahaus, Professor, University of Groningen, Netherlands

Flow improvements in healthcare require an understanding of the relationship between variability, buffers, and patient flows. This multiple case study shows complexities related to this relationship. We investigate patient flows where improvements were attempted. Results indicate that the interaction between variability and buffers is less straightforward than we would assume.

065-0261  The Challenge of Lean Process in UK Healthcare
Olga Matthias, Senior Lecturer, University of Bradford, United Kingdom
Steve Brown, Professor, University of Exeter, United Kingdom

Lean is one of those operations management initiatives that has received significant attention from both practitioners and scholars within service environments. We discuss the opportunities and blockages in implementing Lean within healthcare. We also explore the key role of operations strategy in devising and implementing Lean practices in this field.

065-2008  Lean Healthcare: Implementation Challenges in the Emerging Economies
Mohsin Malik, Assistant Professor, Abu Dhabi University, United Arab Emirates

We explore barriers and enablers in lean healthcare implementation in emerging economies, such as the United Arab Emirates. Key healthcare managers are interviewed to identify the factors that are likely to contribute to or limit the success of healthcare process improvement initiatives such as Lean and Six Sigma.

<table>
<thead>
<tr>
<th>43</th>
<th>Friday, 09:45 AM - 11:15 AM, Crystal</th>
<th>Track: Healthcare Operations Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair(s): Roger Bohn</td>
<td>Session: Checklists and other tools to prevent errors during surgery</td>
<td></td>
</tr>
</tbody>
</table>

065-1285  Risk Analysis of Surgical Planning: A Case Study in a Brazilian Public Hospital of Oncology
Ana Saut, Student, Universidade De Sao Paulo, Brazil
Anne Ramos, Student, Universidade De Sao Paulo, Brazil
Fernando Bessanet, Professor, Universidade De Sao Paulo, Brazil
Marília Carvalhinh, Student, Universidade De Sao Paulo, Brazil

We demonstrate the applicability of the Health Care Failure Mode and Effect Analysis tool (HFMEA) by reporting an experience in surgical planning. Use of this tool reduced errors, with reports of only three near-misses in one year, indicating that the tool was highly effective.

065-1961  Use of a Structured Handoff Tool to Improve Preoperative Communication
Christopher Henson, Assistant Professor, Vanderbilt University, United States
Friday, 09:45 AM - 11:15 AM

Transfer of care is directly related to patient complications and outcomes. Data supports using structured handoffs for many settings, but little is known about the preoperative environment. Our study evaluates the incidence of problems encountered during pre-anesthetic handoffs and discusses quantifiable improvement with the institution of a structured preoperative handoff tool.

065-0886  Checklist for Safe Surgery: Barriers to Implementation in an Ophthalmology Service
Antonio Silva, Student, University of Sao Paulo, Brazil
Maria Gouvea, , University of Sao Paulo, Brazil
Everton Torres, Student, USCS, Brazil
Edna Maia, Quality Analyst, Prevent Senior, Brazil
Paulo Menezes, Manager, Prevent Senior, Brazil

We explore integration between participant action research and quality tools to identify barriers to implementing a checklist for safe surgery. Results show an improvement of 308% over the non-conformities after implementation of the solutions identified in the research.

065-1221  Pilots' Errors Kill Pilots, But Doctors' Errors Don't Kill Doctors: Slow Adoption of Checklists
Roger Bohn, Professor, 1979, United States

Standard procedures and checklists were not adopted widely in military aviation until decades after its invention. Culture was an obstacle; colorful older pilots modeled noncompliance for new pilots. Adoption was easier when pilots were shot down in large numbers, removing them as role models. We study this example's implications for the adoption of standard procedures and checklists in healthcare.

44  Friday, 09:45 AM - 11:15 AM, Lanai  Session: Drivers of Productivity  Chair(s): Maria Ibanez

Track: Behavior in Operations Management

065-0132  Discretionary Task Ordering: Queue Management in Radiological Services
Maria Ibanez, Student, Harvard University, United States
Jonathan Clark, ,
Robert Huckman, Professor, Harvard University, United States
Bradley Staats, Associate Professor, University of North Carolina Chapel Hill, United States

A long line of research examines task-scheduling policies taking the perspective of a central planner. However, workers often have discretion to deviate from the assigned order. Using data from physicians reading more than 2.4 million radiological studies, we examine the conditions under which discretion is exercised and the performance implications.

065-0305  Experimental Evidence of Pooling Outcomes under Information Asymmetry
William Schmidt, Assistant Professor, Cornell University, United States
Ryan Buehl, Professor, Harvard University, United States

We provide experimental evidence that decision makers are more likely to choose a pooling outcome compared to the more commonly studied least cost separating outcome. The choice to pool is influenced by changes in the underlying newsvendor model and is especially pronounced among participants reporting greater understanding of the setting.

065-0538  Does Practice Make Perfect? An Empirical Study of Physician Workload and Performance
Min Chen, Assistant Professor, Florida International University, United States

We use a large detailed patient-level dataset covering all acute-care hospital discharges in Florida to understand the impact of increased workload on physician performance. In particular, we examine the mechanisms that facilitate learning and improve physician performance, focusing on the matching between physicians and patients and task experience.

065-0619  Trust as A Substitute for Contracting
Blair Flicker, Student, University of Texas Dallas, United States
Gary Bolton, Professor, University of Texas Dallas, United States

Many studies in behavioral operations document the shortcomings of human decision-makers, but few investigate settings where humans outperform so-called optimal algorithms. In games with Pareto-inefficient Nash equilibria, efficiency can be restored either via binding contracts or trust among players. When contracting is costly, reliance on interpersonal trust can be profit-maximizing.

065-1786  The Effect of Servers' Work Aversion in Multi-Server Queues On Pooled Vs. Dedicated Configurations
Mor Armony, Associate Professor, New York University, United States
Guillaume Roels, Associate Professor, University of California Los Angeles, United States
Humy Song, Student, Harvard University, United States

Motivated by empirical evidence, we consider a multi-server queueing system where servers are work-averse. In contrast to traditional queueing theory, we show that, when service capacities are endogenously chosen by strongly work-averse servers, dedicated queue configurations often result in lower throughput times than pooled configurations, especially when demand is low.

Track: Retail Operations Management

065-0518  Omni-Channel Inventory Allocation in Fashion Retailing
Aydin Alptekinoglu

Session: Omni-channel Retail Operations  Chair(s): Aydin Alptekinoglu

Saturday, 09:45 AM - 11:15 AM

Transfer of care is directly related to patient complications and outcomes. Data supports using structured handoffs for many settings, but little is known about the preoperative environment. Our study evaluates the incidence of problems encountered during pre-anesthetic handoffs and discusses quantifiable improvement with the institution of a structured preoperative handoff tool.

065-0886  Checklist for Safe Surgery: Barriers to Implementation in an Ophthalmology Service
Antonio Silva, Student, University of Sao Paulo, Brazil
Maria Gouvea, , University of Sao Paulo, Brazil
Everton Torres, Student, USCS, Brazil
Edna Maia, Quality Analyst, Prevent Senior, Brazil
Paulo Menezes, Manager, Prevent Senior, Brazil

We explore integration between participant action research and quality tools to identify barriers to implementing a checklist for safe surgery. Results show an improvement of 308% over the non-conformities after implementation of the solutions identified in the research.

065-1221  Pilots' Errors Kill Pilots, But Doctors' Errors Don't Kill Doctors: Slow Adoption of Checklists
Roger Bohn, Professor, 1979, United States

Standard procedures and checklists were not adopted widely in military aviation until decades after its invention. Culture was an obstacle; colorful older pilots modeled noncompliance for new pilots. Adoption was easier when pilots were shot down in large numbers, removing them as role models. We study this example's implications for the adoption of standard procedures and checklists in healthcare.

44  Friday, 09:45 AM - 11:15 AM, Lanai  Session: Drivers of Productivity  Chair(s): Maria Ibanez

Track: Behavior in Operations Management

065-0132  Discretionary Task Ordering: Queue Management in Radiological Services
Maria Ibanez, Student, Harvard University, United States
Jonathan Clark, ,
Robert Huckman, Professor, Harvard University, United States
Bradley Staats, Associate Professor, University of North Carolina Chapel Hill, United States

A long line of research examines task-scheduling policies taking the perspective of a central planner. However, workers often have discretion to deviate from the assigned order. Using data from physicians reading more than 2.4 million radiological studies, we examine the conditions under which discretion is exercised and the performance implications.

065-0305  Experimental Evidence of Pooling Outcomes under Information Asymmetry
William Schmidt, Assistant Professor, Cornell University, United States
Ryan Buehl, Professor, Harvard University, United States

We provide experimental evidence that decision makers are more likely to choose a pooling outcome compared to the more commonly studied least cost separating outcome. The choice to pool is influenced by changes in the underlying newsvendor model and is especially pronounced among participants reporting greater understanding of the setting.

065-0538  Does Practice Make Perfect? An Empirical Study of Physician Workload and Performance
Min Chen, Assistant Professor, Florida International University, United States

We use a large detailed patient-level dataset covering all acute-care hospital discharges in Florida to understand the impact of increased workload on physician performance. In particular, we examine the mechanisms that facilitate learning and improve physician performance, focusing on the matching between physicians and patients and task experience.

065-0619  Trust as A Substitute for Contracting
Blair Flicker, Student, University of Texas Dallas, United States
Gary Bolton, Professor, University of Texas Dallas, United States

Many studies in behavioral operations document the shortcomings of human decision-makers, but few investigate settings where humans outperform so-called optimal algorithms. In games with Pareto-inefficient Nash equilibria, efficiency can be restored either via binding contracts or trust among players. When contracting is costly, reliance on interpersonal trust can be profit-maximizing.

065-1786  The Effect of Servers' Work Aversion in Multi-Server Queues On Pooled Vs. Dedicated Configurations
Mor Armony, Associate Professor, New York University, United States
Guillaume Roels, Associate Professor, University of California Los Angeles, United States
Humy Song, Student, Harvard University, United States

Motivated by empirical evidence, we consider a multi-server queueing system where servers are work-averse. In contrast to traditional queueing theory, we show that, when service capacities are endogenously chosen by strongly work-averse servers, dedicated queue configurations often result in lower throughput times than pooled configurations, especially when demand is low.

Track: Retail Operations Management

065-0518  Omni-Channel Inventory Allocation in Fashion Retailing
Aydin Alptekinoglu

Session: Omni-channel Retail Operations  Chair(s): Aydin Alptekinoglu

Saturday, 09:45 AM - 11:15 AM
We propose a stochastic dynamic program to allocate inventories for omni-channel retailers to stores and DCs. We are taking into account the relevant phase-specific products and opportunities costs. We apply it to a real-world case of a European fashion retailer.

**065-0567**  
**Aligning Marketing and Sales: The Case of Online Lead Management**  
John Semple, Professor, Southern Methodist University, United States  
Edward Fox, Associate Professor, Southern Methodist University, United States  
Laura Norman, Student, Southern Methodist University, United States

Firms engaged in personal selling often invest substantial portions of their marketing budgets on lead generation. In generating lead such firms hire marketing agents. We study the effectiveness of various contractual mechanisms, used within firms and in markets, to resolve the lead management contracting problem.

**065-1443**  
**Choosing an N-Pack of Substitutable Products**  
Ju Myung (J.M.) Song, Student, Rutgers Business School, United States  
Yao Zhao, Associate Professor, Rutgers University, United States

We use dynamic programming to determine the optimal consumption policy and the maximum expected value of consuming an n-pack of substitutable products. We then use optimization to identify a consumer's optimal n-pack. We consider models both with and without an outside option and explore the variety implications of each model.

**065-0965**  
**Omni-Channel Retail in the Presence of Operational Frictions**  
Xiaomeng Guo, Washington University St Louis, United States  
Panos Kouvelis, Washington University St Louis, United States  
Danko Turcic, Washington University St Louis, United States

Some firms are implementing omni-channel strategies by offering consistent products and prices across their multiple channels, and some other firms essentially prevent seamless transition between different channels. Our paper provides a game-theoretical model to compare the traditional multi-channel and omni-channel strategies by focusing on product and price consistency.

**Friday, 09:45 AM - 11:15 AM, Edelweiss**  
**Session:** Transportation and Logistics  
**Track:** Scheduling and Logistics  
**Chair(s):** Andrew Johnson, Yao Zhao

**065-0658**  
**Transportation Planning and Scheduling for the 2014 Special Olympics Games**  
Andrew Johnson, Assistant Professor, Rowan University, United States  
Yao Zhao, Associate Professor, Rutgers University, United States

The 2014 Special Olympics USA Games were hosted in New Jersey where over 4,000 athletes and coaches competed in 16 sports hosted across 10 locations within a 40-mile radius. We designed timely, convenient, easy-to-follow and reliable bus routes and schedules under a budget of $600K.

**065-2024**  
**Diagnosis of a Complex Logistics Network**  
Ju Myung (J.M.) Song, Student, Rutgers Business School, United States  
Yao Zhao, Professor, Rutgers University, United States

Naval logistics represents an important facet of mission critical logistics. We extend mission critical logistics research by analyzing the fulfillment process for the US Navy destroyer fleet's Ballistic Missile Defense platform and evaluate the fulfillment performance of the Defense Logistics Agency (DLA) - the sole distributor to the US Navy.

**065-0080**  
**Economies of Scale in Logistics Hubs: Determining the Discount Factor in Brazil**  
Carolina Luisa Vieira, Student, Federal University of Santa Catarina, Brazil  
Mônica Maria Luna, Associate Professor, Federal University of Santa Catarina, Brazil

Logistics hubs impact the efficiency of transportation systems by reducing costs and improving the synchronization of the flows of goods. We discuss how to determine an economics of scale factor for logistics hubs within the Brazilian transportation network.

**Friday, 09:45 AM - 11:15 AM, Fuschia**  
**Session:** Empirical research in OM I  
**Track:** Empirical Research in Operations Management  
**Chair(s):** Brian Jacobs

**065-0045**  
**A Mindful Approach to Reducing Retail Shrink Rate**  
Hung-Chung Su, Assistant Professor, University of Michigan Dearborn, United States  
Kevin Linderman, Professor, University of Minnesota, United States  
Johnny Rungtusanatham, Professor, Ohio State University, United States

This study draws on the organizational control and high reliability theories to empirically understand how retail store security affects shrink rate. The results show that security communication and formal security policies enable security alertness. The empirical results also highlight the importance of establishing organizational security mindfulness in a retail context.

**065-0104**  
**Appointments of Corporate Sustainability Leaders and Firm Performance**  
Priyank Arora, Student, Georgia Institute of Technology, United States  
Manpreet Hora, Associate Professor, Georgia Institute of Technology, United States  
Vinoth Singhal, Professor, Georgia Institute of Technology, United States  
Ravi Subramanian, Associate Professor, Georgia Institute of Technology, United States

In recent years, firms have been appointing environmental and sustainability officers to their top management teams. We investigate the association between announcements pertaining to such appointments and stock market reaction.

**065-0251**  
**The Role of Managerial Commitment on the Relationship between Controversy and Environmental Practice Adoption**  
Rick Hardcopf, Student, University of Minnesota, United States
Firms adopt EMPs to minimize impact on the natural environment. Using secondary data, we examine how EMP adoption changes following a negative event such as a spill or pollution. Contrary to conventional wisdom, we show adoption reduces following negative events and managerial commitment does not mitigate the relationship.

Field visits and interviews with resellers yield interesting insights on practices for acquisition of used products and marketing them to the public. We review how those practices provide avenues for future Closed Loop Supply Chain research.

A network externality arises when utility depends not only on attributes, but also on the number of consumers who purchase the same product. We propose and analyze consumer choice models that endogenize such network externality. An empirical analysis shows that our proposed model performs well in terms of data fitting and prediction.

In this work, we introduce and obtain a complete analytical characterization of a very broad class of mechanisms, which we refer to as early-purchase reward (EPR) programs, to counteract strategic consumer behavior.

We study a fundamental inventory problem that arises in the context of processing consumer returns in a batch mode. We consider stochastic demands and stochastic returns along with fixed operational costs and disposal opportunities. We propose and analyze a comprehensive set of periodic and threshold batching policies.

We study two crucial questions regarding retail return policies. First, whether the theoretical drivers of return policy are actually at work in practice. Second, how much demand benefits can a return policy generate.

We study the association between in-store customer experiences during returns and immediate exchange/subsequent repurchase behaviors. Using over 21 million purchase and return transactions and nearly 8,600 customer satisfaction survey responses, we empirically examine this association with respect to product quality, customer-oriented selling, and time to return.
This paper investigates return abuse with respect to fraudulent and opportunistic consumer returns and potential countermeasures to fight them. It also shows how those countermeasures impact a retailer’s profitability, demand structure, and policy parameters with respect to price and refund. To some extent, our findings contradict suggestions in the literature.
The theory of even, swift flow has recently been forwarded as a theory through which historical development of manufacturing can be explained. We contend that there are two other important theories of production, namely transformation and value generation, and all three are needed for a comprehensive picture of production.

**065-1280** An Integrated Approach for Capacity, Manufacturing and Sales Planning in Global Production Networks  
Qian Huang, Student, Waseda University, Japan  
jiahua Weng, Associate Professor, Waseda University, Japan  
Hisashi Onari, Professor, Waseda University, Japan  

Production planning is vital for global manufacturing firms due to large changes in market demands and production environment. We focus on production allocation, capacity decisions for manufacturing, and sales planning simultaneously without limiting any possible increase in profit. We propose a metaheuristic algorithm to optimize the production planning problem.

**065-1283** An Approach to Integrate Overall Equipment Efficiency and Data Envelopment Analysis  
Alaercio Paris, Student, Universidade do Vale do Rio dos Sinos, Brazil  
Daniel Lacerda, Associate Professor, 1979, Brazil  
Luís Felipe Camargo, Assistant Professor, 1979, Brazil  
Luís Rodrigues, Professor, UNISINOS, Brazil  
Ricardo Cassel, Associate Professor, Univ Federal Do Rio Grande Do Su, Brazil  

Overall Equipment Efficiency (OEE) is a traditional metric that evaluates the performance of an operation. However, it does not take into consideration a number of resources that are related to that operation. Our research proposes an approach to evaluate operations performance integrating OEE and Data Envelopment Analysis (DEA).

We present operating strategies for manufacturing systems using simulation. An existing manufacturing facility is replicated in a virtual environment using Arena simulation software. Different manufacturing scenarios are studied and new strategies are developed to improve the performance parameters of the plant, including resource utilization, inventory management, and work in process.

**065-1366** Design and Analysis of a Pharmaceutical Continuous Flow Manufacturing System Using Value Stream Mapping  
Leda Todorova, Student, University of Strathclyde, United Kingdom  
Alex Duffy, Professor, University of Strathclyde, United Kingdom  
Kerem Akartunalı, Senior Lecturer, University of Strathclyde, United Kingdom  

The challenging operating environment has forced R&D pharmaceutical companies to investigate innovative manufacturing technologies in order to maintain competitiveness in the global market. We use a value stream mapping approach to examine productivity improvement and cost reduction in pharmaceutical manufacturing after implementation of continuous processes.

**065-1317** Vertical Integration and Firm Performance: An Empirical Analysis of Manufacturing Firms  
Florian Kaiser, Student, University of Passau, Germany  
Robert Obermaier, Professor, University of Passau, Germany  

We analyze the relationship between the degree of vertical integration and financial performance of a large sample of German manufacturing firms. We discuss the finding of an inverted U-shaped relationship accompanied by a decreasing degree of vertical integration over time.

**065-0431** A Literature Review of Lean Maturity Level Tools  
Elaine Cetnarski, Student, Pontifical Catholic University of Parana, Brazil  
Caio Ferreira, Student, Pontifical Catholic University of Parana, Brazil  
Sergio Gouveia da Costa, Professor, Federal University of Technology - Parana - Brazil, Brazil  
Edson Pinheiro de Lima, Associate Professor, Pontifical Catholic University of Parana, Brazil  
María Eduarda Souza, Student, Pontifical Catholic University of Parana, Brazil  

We present a literature review on Lean tools, Lean maturity level tools in companies, and tools for performance analysis. The results offer a preliminary study for the development of a new model and a process for analysis of Lean maturity level.

**065-0888** The Role of Decision Rights in Collaborative Development Initiatives  
Vishal Agrawal, , Georgetown University, United States  
Nektarios Oraiopoulos, , Cambridge University, United Kingdom  

We study initiatives for co-development of new products and technologies. In such settings, it may be difficult a priori to specify contracts contingent on the outcome. Therefore, we investigate the efficacy of different contractual structures which instead specify the decision-making process.

**065-1289** Group Structure, Task Complexity, and Search Strategies in Ambiguous Problem Spaces: A Controlled Experiment  
Stylianos Kavadias, , University of Cambridge, United Kingdom  
Svenja Sommer, Associate Professor, HEC Paris, France  
Elliot Bendoly, Professor, Ohio State University, United States  

In co-development and initiatives, we may need to specify contracts for products and new technologies. In such settings, it may be difficult a priori to specify contracts contingent on the outcome. Therefore, we investigate the efficacy of different contractual structures which instead specify the decision-making process.
The effective use of group problem solving in the search for solutions over ambiguous problem spaces remains a challenge. In a controlled two-stage experimental design, we explore the impact of group structure, task complexity, search strategies, and group diversity on problem solving performance.

We present an experimental study that examines whether feedback changes how people work, and whether it affects the creativity of their work product.

Understanding Customers' Retrivals in Call Centers: Preference of Service Speed and Service Quality
Keja Hu, Student, Northwestern University Kellogg School o, United States
Gad Allon, Professor, Northwestern University, United States
Achal Bassamboo, Associate Professor, Northwestern University, United States

We studied customers' retrieval behavior in the call center and quantified customers' preference of service speed and service quality.

Modelling Service Times in a Call Center
Rouba Ibrahim, Assistant Professor, University College London, United Kingdom
Pierre L'Ecuyer, Professor, University of Montreal, Canada
Haipeng Shen, Professor, The University of Hong Kong, United States
Mamadou Thiongane, Student, University of Montreal, Canada

We carry out a large-scale data-based study of service times in a call center with heterogeneous agents and multiple call types. We develop service-time models that account for properties that we observe in our data, and quantify the operational impact of those models by a simulation study.

Vertical Probabilistic Selling: The Role of Consumer Anticipated Regret
Yong Chao, Assistant Professor, University of Louisville, United States
Lin Liu, Assistant Professor, University of Central Florida, United States
Dongyuan Zhan, Assistant Professor, University College London, United Kingdom

We study vertical probabilistic selling (mixing products with different qualities) when firms compete, and consumers have different abilities to anticipate the potential post-purchase regret from obtaining the inferior products. We find probabilistic selling arises more often and yields higher profit when consumers regret partially compared with no or full regret.

Want Priority Access? Refer Your Friends to Skip the Line
Luyi Yang, Student, University of Chicago, United States
Laurens Debo, Associate Professor, Dartmouth College, United States

Motivated by novel business practices in emerging financial services companies, we study the referral incentive program in a signup queue where customers can refer friends to gain priority access on the waitlist.

The Impact of Hidden-City Travelers on Airfares When Airlines Compete
Jaelynn Oh, Assistant Professor, University of Utah, United States
Tim Huh, Associate Professor, University of British Columbia, Canada

We study the impact of hidden-city travelers on airfare and consumer surplus when airlines compete on a hub-and-spoke flight network.

Capacity Investment with Demand Learning
Anyan Qi, Assistant Professor, University of Texas Dallas, United States
Hyun-Soo Ahn, Professor, University of Michigan Ann Arbor, United States
Amitabh Sinha, Associate Professor, University of Michigan Ann Arbor, United States

We study a firm's strategy to adjust its capacity using information learned from observed demand. We characterize the firm's optimal policy and develop an easily-implementable and data-driven heuristic for when and by how much the firm should adjust its capacity. We also numerically validate the performance of our heuristic.

Open Or Closed? Technology Sharing, Supplier Investment, and Competition
Bin Hu, Assistant Professor, University of North Carolina Chapel Hill, United States
Ming Hu, Associate Professor, University of Toronto, Canada
Yi Yang, Associate Professor, Zhejiang University, China

Competing technologies discourage supplier investments. We study competing manufacturers' open-technology strategy, which induces supplier investments but also intensifies future competition. We show that open technologies can constitute an equilibrium and identify a prisoner's-dilemma situation. Finally, we show that manufacturers may close technologies to force supplier investments.
Innovations in Teaching Simulations: Fresh Connection

Steve Melnyk, Professor, Michigan State University, United States

Students learn in various styles. An emerging style is learning by doing, hence simulation. The Fresh Connection is a supply chain simulation of a juice manufacturer losing money due to poor supply chain decisions. This gives learners the opportunity to experience the results of the application of the SCM principles.

Cybersecurity within the Supply Chain: Current State, Future Opportunities

James Ko, Student, Michigan State University, United States
Steve Melnyk, Professor, Michigan State University, United States
William Ritchie, Associate Professor, James Madison University, United States
John Ni, Assistant Professor, University of Rhode Island, United States

Cybersecurity is a relatively new development in risk management. We explore the current state of research into cybersecurity, with special attention devoted to the supply chain. We summarize the current state of research with the goal of identifying potential areas and theoretical frameworks for future research.

Pricing and Advertising the Relief Goods under Various Information Sharing Scenarios

Ting Zhang, Student, University of Science & Technology, China
Linda (Xiaowei) Zhu, Associate Professor, West Chester University of PA, United States

We study the strategic implications of advertising and pricing problem with market disruptions where a manufacturer sells relief goods to the end customers through a retailer in a natural disaster. We focus on the impact of forecast and the value of keeping information private on advertising and pricing decision.

Quantifying Supply Chain Network Resilience

Yuhong Li, Student, Virginia Polytechnic Institute And State University, United States
Christopher Zobel, Professor, R.B. Pamplin Professor of BIT, United States

The risk diffusion mechanism in a supply chain network is critical to its health. As resilience is a holistic measure of the system health, we provide a framework to quantify the supply chain network resilience, and gain insights into how network structure influences resilience.

A Dynamic Performance Index to Measure the Resilience Performance of a Supply Chain

Thomas Vempiliyath, Student, Indian Institute of Technology Kharagpur, India
Biswajit Mahanty, Professor, Indian Institute of Technology Kharagpur, India

While recovering from a major disruption, a supply chain goes through a series of phases. Quantifying the resilience performance of the supply chain is a major challenge. We present a dynamic performance index in order to achieve this.

Panel: Big Data in Supply Chain Management

Chair(s): Nada Sanders, Ram Ganeshan

Big Data holds significant promise for improving supply chain management. Analyzing vast amounts of varied data in real time helps firms better understand customers, reduce costs, better manage risk, improve sourcing decisions, and can lead to unprecedented revenue generating sources. This panel discussion will explores these opportunities.

The Value of Product Returns: Intertemporal Product Management with Strategic Consumers

Narendra Singh, Assistant Professor, Indian School of Business, India
Karthik Ramachandran, Associate Professor, Georgia Institute of Technology, United States
Ravi Subramanian, Associate Professor, Georgia Institute of Technology, United States

We study the impact of consumer product returns and the potential refurbishing of returned goods on the intertemporal product strategy of a firm facing strategic consumers. We show that returns may act as a commitment device for the firm facing a time inconsistency problem, and that firm profit could increase with the return rate.

Contracting for Reuse Under Conditions of Uncertainty at a Third-Party Refurbisher

Aditya Vedantam, Assistant Professor, University of Buffalo, United States
Ananth Iyer, , Purdue University, United States

Managing the traditional end-of-life disposition of used electronics at operations involving reuse and recycling is complicated by the variable condition of incoming units. We show how uncertainty in the reverse supply chain can be managed by sharing resale values between the product recovery facility and the customer.

The Impact of Carbon Pricing on Energy Efficiency and Social Welfare: The Case of Aluminum Smelting Industry
We study the impact of a carbon pricing policy on the energy efficiency investment decisions of a primary aluminum smelter. We also derive impact on the smelter’s profitability, as well as the total social welfare, taking into consideration the social and environmental externalities of the smelter’s operations.

In complex professional service outsourcing relationships, factors contributing to inter-organizational dependence can be subject to misinterpretation, potentially causing two exchange partners to perceive relative dependence differently. We investigate how such dependence perception misalignment presents challenges to managing inter-organizational relationships and affect professional service project outcomes.

We study the demand forecast updating on component matching performance in the context of automobile assembly products. Using an analytical model and simulation, we show the value of demand forecast updating and show how the performance varies with problem parameters.

We study how different power bases of the manufacturer impacts the relationship between manufacturer, tier-1 and tier-2 suppliers. We conjecture that if manufacturer circumvents tier-1 to manage tier-2 without the approval of tier-1, it will negatively impact the relationship between tier-1 and tier-2 supplier as well as supply chain performance.

Mobile money agents exchange cash for electronic value and vice versa, forming the backbone of an emerging electronic currency ecosystem in the developing world. We model the agent's inventory problem, determine optimal quantities, and evaluate the recommendations with East African data.

We study an important but widely neglected topic in humanitarian operations: armed conflicts. Using data envelopment analysis and econometric models, we analyze empirically the effect of man-made disasters (i.e. armed conflicts) on the operational performance of rural hospitals: total factor productivity, efficiency and patient satisfaction.

We develop a quantitative model to analyze stockpile capacity and propose metrics based on model results to assess decisions over time. Using data on inventory stored by various organizations we analyze stockpiles hosted by the UN and report illustrative daily metrics available on a public website.
The commercial center of Santiago, Chile, is highly congested making last-mile delivery operations very complex. We present a model to design an urban transshipment network in which locations of loading/unloading bays are established using queueing theory. We discuss how this model can be used to implement an integral mobility plan.

A compact automated parking system is a fully automated parking system, storing cars compactly. We analyze the performance of such systems and investigate both discrete and continuous lifts under a dedicated and a generic operating policy. We formulate open queueing networks for single-tier and multi-tier systems.

We discuss the Brazilian rail concession and its correlation with the beltway in Sao Paulo using an exploratory research methodology. The results indicate the end of the monopoly and the future implementation of an open access business model.

3D printing is exploding. With 3D printing or Additive Manufacturing, instead of products and parts being molded, cast, or machined out of blocks of metal or plastic, they are "printed" by machines that build up thin layers of plastic or metal to make an object. We evaluate Additive Manufacturing as a disruptive technology.
<table>
<thead>
<tr>
<th>Session</th>
<th>Track</th>
<th>Chair(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-0179</td>
<td>Humanitarian Operations and Crisis Management</td>
<td>Mahyar Eftekhar</td>
</tr>
<tr>
<td>065-0203</td>
<td>Humanitarian Operations and Crisis Management</td>
<td>Kenneth Boyer, Professor, Ohio State University, United States</td>
</tr>
<tr>
<td>065-0253</td>
<td>Humanitarian Operations and Crisis Management</td>
<td>John Gray, Associate Professor, Ohio State University, United States</td>
</tr>
<tr>
<td>065-0488</td>
<td>Humanitarian Operations and Crisis Management</td>
<td>Joline Uichanco, Assistant Professor, University of Michigan Ann Arbor, United States</td>
</tr>
<tr>
<td>065-1038</td>
<td>Humanitarian Operations and Crisis Management</td>
<td>John Gray, Associate Professor, Ohio State University, United States</td>
</tr>
<tr>
<td>065-0222</td>
<td>Supply Chain Management</td>
<td>Manpreet Hora</td>
</tr>
<tr>
<td>065-0778</td>
<td>Supply Chain Management</td>
<td>Mahyar Eftekhar</td>
</tr>
<tr>
<td>065-1085</td>
<td>Supply Chain Management</td>
<td>Mahyar Eftekhar</td>
</tr>
<tr>
<td>065-1972</td>
<td>Supply Chain Management</td>
<td>Soomin Park</td>
</tr>
</tbody>
</table>

**A Study of Logistics Outsourcing Based on Theory of Production Competence**

Session: Logistics and Supplier Management in Supply Chains

Chair(s): Soomin Park

We study antecedents of fulfillment errors and their effect on performance in downstream partners. We observe how the different dimensions of order complexity impacts cost and quality of fulfillment downstream, and how strategic decisions of upstream suppliers, as well as power difference between those parties mediates these associations.

---

**Funds allocation in NPOs: the role of administrative cost ratios**

A widely used benchmark for measuring the efficiency of Non-Profit Organizations (NPOs) faces severe criticism because variations of overhead costs are not necessarily linked to the impact achieved and lead to increasing negative effects on administrative capacities. This work provides an analytical framework for analyzing decision making concerning administrative costs.

**Efficient Medical Surplus Recovery**

We analyze an NGO that recovers and manages medical products to fill the needs of under-served healthcare facilities in developing countries. Using a game theoretic analysis, we identify operational mechanisms that can improve the NGO’s welfare provision capability and numerically validate our results using real life data.

**A Column Generation Approach for Locating Roadside Clinics in Africa Based on Effectiveness and Equity**

We propose a novel approach to select locations for roadside clinics that provide African truck drivers with access to basic healthcare services. The aims are to maximize patient volume, to ensure continuity of access along the routes, and to improve equity in health delivery among different truck driver populations.

**A Robust Model for Pre-Positioning Emergency Relief Items before a Typhoon with an Uncertain Trajectory**

We describe a collaborative work with the Philippine government on a pre-positioning model in preparation for a typhoon, where the typhoon trajectory is unknown. To motivate our model, we fit a random coefficient model to a dataset of typhoon effects, revealing a significant relationship between wind speed and affected population.

**Optimal Procurement Policy for Different Inventory Types**

To fulfill beneficiaries’ demands, humanitarian organizations should design a cost-efficient and time-effective procurement policy. We analyze different procurement scenarios to suggest procurement policies through which goods are procured at the best possible cost. Our model takes an organization’s mandate, demand characteristics, and lead-time uncertainty into account.

**The Longitudinal Impact of Supplier Development Efforts on a Buying Firm’s Performance**

We investigate the positive financial impacts of Supplier Development Efforts (SDE) in the context of economic crisis in South Korea, using a multilevel random coefficient model on a 7-year panel data constructed from primary and secondary data sources. We find that SDE contributes to building robust supply chains.

**Supply Management and Supply Risk**

We examine whether, when, and how well-intentioned decisions related to the management of suppliers can inadvertently adversely affect supply risk, both at the firm level and the industry level. We employ simulation with realistic parameters to illustrate our assertions.

**Mitigating Supplier Fulfillment Errors in Supply Chain**

We study antecedents of fulfillment errors and their effect on performance in downstream partners. We observe how the different dimensions of order complexity impacts cost and quality of fulfillment at downstream partner, and how strategic decisions of upstream supplier, as well as power difference between those parties mediates these associations.
We apply the Theory of Production Competence to an inter-organizational setting, specifically to logistics outsourcing. We offer past research results on logistics outsourcing, a hypothesized model framework and propositions, and reliability and validity of key constructs. We summarize implications for development of logistics capabilities consistent with business strategies.

**065-0083** A New Perspective on the Concept of Logistics Hubs
Carolina Luísa Vieira, Student, Federal University of Santa Catarina, Brazil
André Catapan, Student, Universidade Federal De Santa Catarina, Brazil
Mônica Maria Luna, Associate Professor, Federal University of Santa Catarina, Brazil
The concept of logistics hubs is still far from reaching an agreement in literature. By evaluating different concepts and hierarchies of logistics facilities, we bring a new perspective on the definition of logistics hubs. We also propose a classification based on hub positioning on the distribution network and goods handled.

**065-0093** Logistics Services: A Case Study of a Metal Mechanical Industry
Jose Martino Neto, Professor, Centro Paula Souza - São Paulo, Brazil
José Neves, Retired, Centro Paula Souza - São Paulo, Brazil
Getulio Akabane, Retired, Centro Paula Souza - São Paulo, Brazil
Neemias Ferreira, Student, Centro Paula Souza - São Paulo, Brazil
Caio Lago, Student, Centro Paula Souza - São Paulo, Brazil
Our research establishes comparison among tangible and intangible logistics in a metal mechanic industry located in Brazil. Our results addressed advantages in different business models in order to understand that some independent or combined actions should be taken to give value added effect to the company results.

**065-0342** Comparing Ready Rate Performance for a Supplier in Single and Multiple Customer Cases
James Minas, Assistant Professor, Suny New Paltz, United States
Osama Alamri, Student, Royal Melbourne Institute of Technology, Australia
Babak Abbasi, Associate Professor, Royal Melbourne Institute of Technology, Australia
Panlop Zeephongsekul, Professor, Royal Melbourne Institute of Technology, Australia
We study the ready rate service level for a supplier in both the single and multiple customer cases. In each case we analyze the effect of review period length, base-stock level and penalty type (lump-sum or linear) on the supplier's cost function.

**065-2043** Screening for Hepatocellular Carcinoma Under Limited Resources
Ella Lee, Student, University of Michigan Ann Arbor, United States
Mariel Lavieri, Assistant Professor, University of Michigan Ann Arbor, United States
Michael Volk, Assistant Professor, University of Michigan Ann Arbor, United States
We model the problem of screening a population at risk for liver cancer when resources are limited as a restless bandit problem. We derive the optimal policy for this problem, and then compare its performance against current screening practice in a simulation built upon historical patient data.

**065-0833** Incentive-Compatible Pre-hospital Triage in Emergency Medical Services
Eric Webb, Student, Indiana University Bloomington, United States
Alex Mills, Assistant Professor, Indiana University, United States
The Emergency Medical Services (EMS) system is designed for emergencies, but too many non-emergency patients seek healthcare through EMS. We evaluate the incentive-compatible reimbursement structures under which pre-hospital triage (where EMS staff identify patients to be safely diverted away from the hospital) could be implemented to reduce hospital crowding.

**065-1675** Nurseline: Telephone Triage for Improved Patient Quality of Care
Ozden Cakici, Assistant Professor, American University, United States
Alex Mills, Assistant Professor, Indiana University, United States
A major challenge in healthcare is the need to match the patient's medical condition to the right provider. Patients are medically inexperienced, so their decision can lead to costly service mismatches. We model the effect of adding telephone triage on the patient's decision as a partially observable Markov decision process.

**065-0496** Linking Digital Data Management and Meaningful Communication Between Healthcare Providers and Patients
David Zepeda, Assistant Professor, Northeastern University, United States
Yang Lee, Associate Professor, Northeastern University, United States
Motivated by the increased discussion on complexities associated with patient-centric care, we evaluate the impact of using interoperable and accessible digital healthcare data, as well as the patient experience in primary care operations.

**065-0499** Evaluating Telemedicine Adoption in Clinics: Accounting for Its Antecedents and Consequences

- Xiaojin Liu, Student, University of Minnesota, United States
- Susan Goldstein, Associate Professor, University of Minnesota, United States
- Karen Soderberg, Assessment and Evaluation Coordinator, Minnesota Department of Health, United States
- Kingshuk Sinha, Professor, University of Minnesota, United States

Telemedicine, the technology-enabled remote delivery of clinical care, is one potential means of improving patient access to health care services. We investigate how socioeconomic, geographical, and organizational characteristics determine telemedicine adoption in clinics, and examine how telemedicine interacts with technological characteristics on health care delivery effectiveness.

**065-0516** System Neglect: Is the Prediction of Patient Activation Prone to Biases?

- Carrie Queenan, Assistant Professor, University of South Carolina, United States
- Kellas Cameron, Student, Boston University, United States
- Nilin Joglekar, Associate Professor, Boston University, United States

Patient healthcare choices vary based on patient activation - skills, knowledge, and motivation concerning health. Using a dataset of chronic care patients, we show the prediction of activation levels is associated with biases dependent on information signals and patient characteristics. Implications of these findings are outlined for patient-centric operations.

**Friday, 01:30 PM - 03:00 PM**

<table>
<thead>
<tr>
<th>Session: Medical Appointment Scheduling and Walk-In Patients</th>
<th>Track: Healthcare Operations Management</th>
<th>Chair(s): Junghoon Song</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>065-0813</strong> Improving Performance in Open Access Clinics</td>
<td>Tian Xia, Student, Brock University, Canada Ken Klassen, Professor, Brock University, Canada</td>
<td></td>
</tr>
</tbody>
</table>

Open access scheduling provides a number of benefits, including same-day access and improved probability that patients will see their regular physician. However, these clinics are still challenged with reducing waiting time, physician idle time, and clinic overtime. We investigate different scheduling options with varying client loads.

**065-0690** A Comparison Between Appointment Scheduling and Walk-In Strategies

- Mohamad Soltani, Student, University of Alberta, Canada
- Mohamad Soltani, Student, University of Alberta, Canada
- Michele Samorani, Assistant Professor, University of Alberta, Canada
- Mohamad Soltani, Student, University of Alberta, Canada
- Mohamad Soltani, Student, University of Alberta, Canada
- Michele Samorani, Assistant Professor, University of Alberta, Canada

Although it is commonly believed that appointment-based systems are more effective at regulating demand than walk-in systems, we show that this is not always the case. In this study, we analytically identify the conditions under which each system is preferable when considering no-shows, unpunctuality, and service time variability.

**065-0723** Hospital Payment Schemes Under Competition

- Zheng Han, Student, University of Kansas, United States
- Mazhar Arikan, Assistant Professor, University of Kansas, United States
- Suman Mallik, Associate Professor, University of Kansas, United States

We consider two hospitals competing for patients and operating under different payment schemes. Using a game-theoretic approach, we determine equilibrium operating parameters and develop intuition for healthcare policies.

**065-1439** An Investigation of Focus, Quality, and Competition in Hospitals

- Junghoon Song, Student, Suny At Buffalo, United States
- Jurriaan de Jong, Assistant Professor, Suny At Buffalo, United States
- Nallan Suresh, Professor, Suny At Buffalo, United States

Our research empirically examines the impact of focus on quality of care. We prepare sets of focus variables and quality variables to investigate the relationship on several aspects, using a large, longitudinal dataset. Additionally, we explore whether, and under what conditions, regional competition drives hospitals towards more focused operations.

**Friday, 01:30 PM - 03:00 PM**

<table>
<thead>
<tr>
<th>Session: Behavior and Goals</th>
<th>Track: Behavior in Operations Management</th>
<th>Chair(s): Xiaobing Liu</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>065-0714</strong> Supply Chain Leader/Follower Interaction: Managing Change While Focusing On Enterprise-Level Objectives</td>
<td>Robert Overstreet, Assistant Professor, Department of Operational Sciences, United States Matthew Douglas, Assistant Professor, Air Force Institute of Technology, United States Benjamin Hazen, Assistant Professor, University of Tennessee Knoxville, United States</td>
<td></td>
</tr>
</tbody>
</table>

Our qualitative research to date has indicated that multiple aspects of leadership are critical to the successful incorporation of administrative and process innovations. This research effort specifically examines leader/follower interactions in a supply chain organization that is undergoing significant changes with respect to processes and enterprise-level goal alignment.

**065-0832** Failure Modes and Effects Analysis (FMEA): An Experimental Study on Collective Efficacy of FMEA Team

- Brandon Lee, Student, Clemson University, United States

- "一本のページの文書の自然読取りのための純粋なテキスト代表."
Friday, 01:30 PM - 03:00 PM

**065-0834 Team Coordination with Goal Setting: A Real Effort Experiment**

James Fan, Student, Penn State University University Park, United States
Joao Gomez-Minambres, Assistant Professor, Bucknell University, United States

We experimentally investigate the effectiveness of managerial goals for increasing production in team settings. Participants act as workers on a team to complete a real-effort task. An experienced manager can set non-binding goals for the team, and we analyze the impact of these goals on production.

**065-1874 Performance Evaluation of Discrete Manufacturing Workshop Based On Key Performance Indicators**

Xiaobing Liu, Professor, Dalian University of Technology, China

Evaluation on the performance of discrete manufacturing workshop is a tough problem. This paper builds a performance evaluation model based on key performance indicators and BP neural network algorithm to achieve the goal from vertical executing strategy and horizontal operations management perspective. Empirical analysis has proved this method is feasible.

**Friday, 01:30 PM - 03:00 PM, Lanai**

**Session:** Topics in Behavioral Operations Management  
**Track:** Behavior in Operations Management

**Chair(s):** Ruth Beer

**065-0119 Project Management under Risk-Sharing Contracts**

Sina Shokoohyar, Student, University of Texas Dallas, United States
Elena Katok, Professor, University of Texas Dallas, United States
Anyan Qi, Assistant Professor, University of Texas Dallas, United States

We study coordination among contractors in a project under risk-sharing contracts where the payoff of contractors depends on the lowest exerted effort. We propose the information feedback policy which improves coordination in theory. We also report experimental results in line with the theoretical findings.

**065-0348 The Impact of Decision Rights and Long Term Relationships on Innovation Sharing**

Ruth Beer, Assistant Professor, Indiana University Bloomington, United States
Hyun-Soo Ahn, Professor, University of Michigan Ann Arbor, United States
Stephen Leider, Assistant Professor, University of Michigan Ann Arbor, United States

We study a supplier’s incentives to share an innovation with a buyer when sharing the innovation increases efficiency but makes the supplier vulnerable to the buyer sharing it with other suppliers. We show how the supplier’s optimal decision depends on how the buyer allocates decision rights among its employees.

**065-0375 Linking Customer Behavior and Delay Announcements Using a Duration Model**

Qiuping Yu, Assistant Professor, Indiana University, United States
Eric Webb, Student, Indiana University Bloomington, United States
Kurt Brethauer, Professor, Indiana University, United States

We empirically examine how delay announcements affect queue abandonment behavior using a duration model. Our results show announcements induce the reference effect and customers exhibit loss aversion. We also find evidence indicative of the sunk cost fallacy. We then provide insights for staffing policy accounting for observed behavioral factors.

**065-1105 Equity Bargaining In Startups**

Evgeny Kagan, Student, University of Michigan Ann Arbor, United States
Stephen Leider, Assistant Professor, University of Michigan Ann Arbor, United States
William Lovejoy, Professor, University of Michigan Ann Arbor, United States

Startup teams use equity rather than salary to incentivize work. This paper investigates the effects of timing and complexity of equity contracts on founder contribution. We find that performance-dependent and delayed contracting leads to higher contributions when individuals jointly select contract, but not when contracts are imposed exogenously.

**Friday, 01:30 PM - 03:00 PM, Veranda**

**Session:** Operations Management in the Internet Age  
**Track:** Marketing and Operations Management Interface

**Chair(s):** Guowei Liu

**065-1219 Big Data Applications in Business Analysis**

Wenqiang Huang, cmo, China Southern Airlines, China
Sien Chen, ceo, Xiamen University, China
Zhenyu Liu, Professor, Xiamen University, China

Using a dataset provided by an airline company, we demonstrate how to apply big data techniques to explore passengers’ travel patterns and social networks, predict how many times passengers will travel in the future, and segment customer groups based on customer lifetime value.

**065-1472 The Importance of Marketing and Operations Research in the Academy Entrepreneurship**

Claudia Ortega, Student, Universidad Nacional Autonoma de Honduras, Honduras
Marcia Moncada, Student, Universidad Nacional Autonoma de Honduras, Honduras
Mario Acevedo, Student, Universidad Nacional Autonoma de Honduras, Honduras

The world economy dynamics are geared to promoting entrepreneurship in their operations. Nevertheless, to succeed in that, you need to have marketing techniques and operations research to strengthen the business. We focus directly on improvement in the productivity, efficiency and profitability of organizations in this presentation.

**065-0345 Strategic Power Shift by a Dominant Retailer with Manufacturer Learning**

Guowei Liu, Student, Tianjin University, China
Yunchuan Liu, Associate Professor, University of Illinois Urbana-Champaign, United States
Jianxiong Zhang, Professor, Tianjin University, China

This paper studies how a dominant retailer can strategically shift its channel power to a manufacturer in a two-period game with manufacturer learning on reducing production cost in the second period. We show the retailer can benefit from power shift when the manufacturer has a high learning rate.

**065-0240**
**Title:** FTL vs. LTL Shipments: Integral Policies in Stochastic Distribution Systems  
**Authors:** Yang Bo, Student, University of Texas Dallas, United States  
Srilakshmi Malakar, Professor, University of Texas Dallas, United States

The "integrality" question for stochastic inventory models asks about the existence of an integral optimal policy, given integral data. One practical implication of this question lies in the full-truckload vs. less-than-truckload shipping industry. In this paper, we investigate the integrality question in single-product, multi-echelon distribution systems.

**065-0996**
**Title:** Capacity Sharing Among Truck Owners: A Collaborative Approach to Overcome Overloading  
**Authors:** Arindam Debroy, Student, Indian Institute of Technology Kharagpur, India  
Sarada Sarmah, Indian Institute of Technology Kharagpur, India

Capacity shortage is a serious problem for the Indian trucking industry which results in overloading a solution by the carriers. However, this practice is banned as it gives rise to many other problems. A collaborative approach has been proposed to overcome capacity shortage problem without overloading.

**065-0614**
**Title:** Optimal Policy for a Stochastic Scheduling Problem with Applications to Surgical Scheduling  
**Authors:** Harish Guda, Student, University of Texas Dallas, United States  
Milind Dawande, Professor, University of Texas Dallas, United States

We consider the stochastic, single-machine earliness/tardiness problem. The objective is to minimize the expected earliness and tardiness costs by adjusting the job processing sequence and their due-dates. We show that the SVF rule is optimal under the assumption of dilation ordering of the processing durations.

**065-0968**
**Title:** The Optimization Research of Refined Oil Distribution Considering Time-space Distance  
**Authors:** Xuping Wang, Dalian University of Technology, China  
Hongxin Zhan, Researcher, Dalian University of Technology, China

For the MCVRP in product oil, we design a two-phase approach considering time-space distance. Firstly, employing space-time clustering and GA to obtain initial solutions, then applying VNS and disturbance recovery strategy to gain optimization. Lastly, application examples show that the algorithm can effectively narrow the search and achieve better solutions.

**065-0084**
**Title:** Quality Drivers for Hospitals  
**Authors:** Deepa Wani, Student, University of South Carolina, United States  
Manoj Malhotra, Professor, University of South Carolina, United States

The recent Affordable Care Act (ACA) has forced hospitals to improve quality along several dimensions. We study how various factors influence important outcomes such as process quality and patient satisfaction. We also look at whether the impact of these factors has changed since the ACA.

**065-0284**
**Title:** Patterns of Lean and Six Sigma Implementation in US Hospitals  
**Authors:** Jung Young Lee, Assistant Professor, Northern Illinois University, United States  
Kathleen McFadden, Professor, Northern Illinois University, United States

This exploratory study attempts to discover existing patterns of Lean and Six Sigma implementation. Using cluster analysis and ANOVA, we compare the performance and characteristics of a sample of 215 US hospitals. Two types of Six Sigma and Lean implementation clusters are identified. Implications of research findings are discussed.

**065-0925**
**Title:** Individual and Team Learning in DFSS Projects  
**Authors:** Adrian Choo, Georgia State University, United States  
Jamison Kovach, Associate Professor, University of Houston, United States

We examine how individuals and teams learn through Design for Six Sigma projects in behavioral healthcare. As teams worked to design/redesign organizational processes, data were collected through weekly questionnaires to identify patterns of learning over time. Patterns of events corresponding to the patterns of learning identified will be presented.

**065-1551**
**Title:** Implementation of Quality Management Practices and Organizational Learning: An Empirical Investigation  
**Authors:** Hale Kaynak, Professor, The Univ. of Texas Rio Grande Valley, United States  
Azadeh Zamanian, Student, The Univ. of Texas Rio Grande Valley, United States
In this study, we empirically investigate how the duration and sequence of the implementation of quality management practices are related to organizational learning, which, in turn, is related to organizational outcomes. We discuss the implications of the results for researchers and practitioners and offer further research directions.

**Friday, 01:30 PM - 03:00 PM**

<table>
<thead>
<tr>
<th>Track: Service Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>065-0208</strong> Teaching Service Design in an OM/SCM Course: The best two sessions of the semester!</td>
</tr>
<tr>
<td>Chair(s): Scott Sampson</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Track: Closed-Loop Supply Chains</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>065-0991</strong> Modeling Closed-Loop Supply Chain Considering Government Participation</td>
</tr>
<tr>
<td>Sarat Jena, Goa Institute of Management, India</td>
</tr>
<tr>
<td>Sarada Sarmah, Indian Institute of Technology Kharagpur, India</td>
</tr>
<tr>
<td>This paper considers government participation via subsidy and fees on economic efficiency of the remanufacturing system under two models: Subsidies to the manufacturer and subsidies to the collector. An analytical model is formulated for these two models and used to compare subsidies under each model.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Track: Marketing and Operations Management Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>065-0606</strong> Multiple Product Offerings and Position Strategy in Two-Attribute Product</td>
</tr>
<tr>
<td>Yuwen Chen, Associate Professor, University of Rhode Island, United States</td>
</tr>
<tr>
<td>Ruby Dholakia, Professor, University of Rhode Island, United States</td>
</tr>
<tr>
<td>John Ni, Assistant Professor, University of Rhode Island, United States</td>
</tr>
<tr>
<td>We construct an analytical model to multiple product positioning and offering issues for a firm in a market with two attributes - hedonic and utilitarian. We assume that two attributes can be any distance apart from each other. We find several parameters are critical factors determining optimal prices and product positions.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Track: Information in Operations Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>065-0500</strong> User-Generated Content and Competing Firms' Product Design</td>
</tr>
<tr>
<td>Young Kwark, Assistant Professor, University of Florida, United States</td>
</tr>
<tr>
<td>Jianqing Chen, Associate Professor, University of Texas Dallas, United States</td>
</tr>
<tr>
<td>Srinivasan Raghunathan, Professor, University of Texas Dallas, United States</td>
</tr>
</tbody>
</table>
We examine the impact of user-generated content in a setting where two competing firms uncertain about consumer location or valuation design and sell horizontally differentiated products. The results show the sharp contrast depending on whether firms compete on the horizontal location or vertical quality.

065-1112  
Is Technology Eating Nurses? Staffing Decisions in Nursing Homes  
Feng (Susan) Lu, Assistant Professor, Purdue University, United States  
Huaxia Rui, Assistant Professor, University of Rochester, United States  
Abraham Seidmann, Professor, University of Rochester, United States  
We study how IT-enabled automation affects the business strategy of nursing homes in terms of their staffing decisions. We find that the staffing level decreases by 5.8% in high-end nursing homes but increases by 7.6% in low-end homes after the adoption of automation technology.

065-1209  
Has the Structure of Production Changed with IT?  
Fengmei Gong, Assistant Professor, University of Laverne, United States  
Byungwan Koh, Assistant Professor, University of Calgary, Canada  
Barrie Nault, Professor, University of Calgary, Canada  
Over the years, we have seen the changes in the structure of production. Along with these changes, we have observed a steadily increasing trend in IT investment of industries. We examine whether the increase in IT investment is associated with the change in the structure of production in the economy.

065-1104  
Product Family Formation Through Holonic Structure and Analytical Network Process  
M Reza Abdi, Assistant Professor, Bradford University, United Kingdom  
Farideh Delavari Edalat, Assistant Professor, Bradford University, United Kingdom  
We develop conceptual holonic structure for product family formation in reconfigurable manufacturing systems (RMS), and link it to an analytical network process (ANP) model in order to evaluate and select a product family for each configuration stage. The proposed model facilitates holonic flexibility for evaluation of product families, considering market and operational requirements.

065-1371  
A Study of Operations Issues in a Manufacturing Firm Using SAP-LAP Analysis  
Parikshit Charan, Assistant Professor, Indian Institute of Management Raipur, India  
Sudheer Reddy, Professor, NMIT Bangalore, India  
Jitender Madaan, Assistant Professor, Indian Institute of Technology Delhi, India  
We study the factors affecting operations in the manufacture of a product vertical in a machinery plant, using SAP-LAP framework. We identify the key operations drivers in the manufacture of a product vertical so as to enhance operational effectiveness.

065-1779  
A Multi-Objective Genetic Algorithm for Cell Formation in Flexible Manufacturing System  
Kanchan Joshi, Assistant Professor, National Instituteof Industrial Engineering, Mumbai, India  
Vijay Biliokar, Associate Professor, Fr Conceicao Rodrigues College of Engineering, Mumbai University, India  
Karuna Jain, Professor, National Instituteof Industrial Engineering, Mumbai, India  
We present a meta-heuristic algorithm for cell formation in a flexible manufacturing system by grouping machines to process similar parts. A genetic algorithm with multi-objective fitness function is used for the evolution of the algorithm. The performance of the algorithm is tested on problems selected from the literature.

065-1564  
Using the BLEER Method with Data Envelopment Analysis (DEA) for the Balancing Line Problem  
Rodrigo Britto, Assistant Professor, Universidad De Los Andes, Colombia  
Oscar Buitrago, Assistant Professor, Universidad Militar Nueva Granada, Colombia  
Ruth Illada,  
Emilsy Medina Chacón,  
We propose the joint use of the BLEER method that considers ergonomic aspects with Data Envelopment Analysis (DEA) in order to solve the balancing line problem for a company in the automotive sector. The results show that the DEA model reduces the number of possible solutions that can be implemented.
Today, it is challenging for the manufacturer to manage technology products between generations as consumer preferences are more diverse and sophisticated. We study the manufacturer’s equilibrium prices for its new product and a trade-in program when there exists a used-product market where consumers may buy the used product at a lower price.

065-0035 Operational Drivers of Environmental Management Practice (EMP) Adoption
Rick Hardcopf, Student, University of Minnesota, United States
Rachna Shah, Associate Professor, University of Minnesota, United States

Using novel, firm-level secondary data, we conduct a rigorous empirical examination based on an extensive literature review that helps us identify key industry and firm-level operational drivers of who is adopting which EMPs, when, why and where. We also examine financial implications of EMP adoption.

065-0046 Manufacturers Competing Online: The Economic Benefits of Online Sales and Online Customization
Yusen Xia, Associate Professor, Georgia State University, United States
Peter ZHANG, Professor, Georgia State University, United States
Johnny Rungtusanatham, Professor, Ohio State University, United States

Analyzing publicly traded manufacturers, our paper quantifies the economic benefits accruing to manufacturers from decisions to offer an online sales channel and an online customization capability. These economic benefits are moderated by firm size and choice of customization approach.

065-0491 Operational Glitches and Quality Failures in Non-Repetitive Manufacturing: A Transactive Memory Perspective
Diogo Cotta, Student, IE University, Spain
Fabrizio Salvador, Professor, Instituto De Empresa, Spain
Johnny Rungtusanatham, Professor, Ohio State University, United States

In non-repetitive manufacturing, fixing operational glitches often requires expertise from beyond manufacturing. Analyzing data from 192 firms, we find that frequency of operational glitches and external quality failures are more weakly associated when personnel from manufacturing interacts with other functional personnel within a transactive memory system.

065-0039 R&D Spending: Dynamic or Persistent?
Christophe Pennetier, Student, INSEAD, Singapore
Karan Girotra, Assistant Professor, INSEAD, France
Jurgen Mihm, Assistant Professor, INSEAD, France

We study how a given amount of R&D spending is best allocated over time to optimize R&D performance. Using a sample of US public companies, we find that a dynamic allocation strategy is associated with worse R&D performance, and that this result is more pronounced for firms in higher quantiles of the performance distribution.

065-0329 Optimal Supplier Allocation in Collaborative Product Development with Competing Internal Teams
Svenja Sommer, Associate Professor, HEC Paris, France
Timofey Shalpegin, Lecturer, University of Auckland, New Zealand
Christian van Delft, Associate Professor, HEC Paris, France

To reduce the uncertainty inherent in development, manufacturers sometimes deploy competing internal teams, each working on a different technology or design. Often this development takes place in collaboration with key suppliers. We explore how manufacturers should allocate suppliers (with different capabilities) to these teams, considering the impact on supplier efforts.

065-0568 Dynamics of Delegated Search
Morvarid Rahmani, Assistant Professor, Georgia Institute of Technology, United States
Karthik Ramachandran, Assistant Professor, Georgia Institute of Technology, United States

Firms often delegate search for solutions to challenges such as product design, advertisement creation, executive search, etc. We study the dynamics of delegated search. We identify conditions under which the client should use a committed or open-ended approach to evaluating solutions.

065-0721 Testing Contract Theory: Operational Implementation of R&D Alliances
Nyazi Taner, Assistant Professor, SUTD, Singapore
Arnoud De Meyer, Professor, Singapore Management University, Singapore

We review contract theory and hypothesize its implications for the choice between collaborative alliances (where both parties exert joint efforts) and sequential alliances (where, for the most part, the partner takes over going forward). We test these hypotheses through the analysis of a dataset of over 2000 biopharmaceutical alliances.

065-0677 Pricing Theater Seats: The Value of Price Commitment and Monotone Discounting
Necati Tereyagolu, Assistant Professor, Georgia Institute of Technology, United States
Peter Fader, Professor, University of Pennsylvania, United States
Senthil Veeraraghavan, Associate Professor, University of Pennsylvania, United States

We examine the value of price commitment for an orchestra using individual-level purchases over several performances. We use a competing hazards framework to study the ticket purchase timings when customers differ in their valuations and arrival-times. We show how commitment to a monotone discount policy can aid in improving revenues.
### 065-0029  Humans Are Not Machines: The Behavioral Impact of Queueing Design on Service Time

Masha Shunko, Assistant Professor, Purdue University, United States  
Julie Niederhoff, Assistant Professor, Syracuse University, United States  
Yaroslav Rosokha, Assistant Professor, Purdue University, United States

Using behavioral experiments, we examined the impact of dispensability of effort and salience of feedback on worker productivity and how they can be managed via queueing design. We considered two queue design features: queue structure (single vs. parallel) and queue-length visibility (feedback).

### 065-0376  The Reference Effect of Delay Announcements: A Field Experiment

Qiuping Yu, Assistant Professor, Indiana University, United States  
Gad Allon, Professor, Northwestern University, United States  
Achal Bassamboo, Associate Professor, Northwestern University, United States  
Pengfei Guo, Associate Professor, Hong Kong Polytechnic Univ, Hong Kong

We study whether delay announcements induce the reference effect using data from a call center. Our empirical results show that customers are loss-averse in response to delay announcements. We then provide insights on whether and how a firm should provide announcements to the customers accounting for their loss averse behavior.

### 065-0537  Economics of Non-Neutrality on the Internet

Mohammad Hassan Lotfi, Student, University of Pennsylvania, United States  
Saswati Sarkar, Professor, University of Pennsylvania, United States  
George Kesidis, Associate Professor, Penn State University State College, United States

We model the interaction between ISPs, CPs, and end-users in a non-neutral Internet as a two-sided market. We analyze social welfare and the effects of an asymmetric competition between ISPs on the future of the Internet market. Our goal is to provide some insights for future Internet regulations.

### 065-1100  Big Data vs. Small Data? Firms’ Investment in Consumer Profiling with Privacy-Concerned Consumers

Tommaso Valletti, Professor, Imperial College London, United Kingdom  
Jahua Wu, Assistant Professor, Imperial College London, United Kingdom

Firms are making substantial investments to collect and study data in order to profile their customers. However, consumers are becoming more wary about their privacy and are taking actions to stay anonymous. In this paper, we examine the dynamics between firms and privacy-conscious consumers.
In an online review platform, information on the quality of alternative service providers is both generated and utilized by the platform's users. Within a multi-armed bandit framework, policies of information provision to the platform's users affect their aggregate surplus.

**065-1228 Logistics and Cloud Computing Service Providers' Integration: A Resilience Perspective**
Nachiappan Subramanian, Associate Professor, Nottingham University, Ningbo, China, China
Muhammad Abdulrahman, Assistant Professor, The University of Nottingham Ningbo, China, China

The study assesses the resilience of logistics and cloud computing service providers' integration based on cloud computing service providers' integration based on supply chain risk assessment framework. The relation between capability factors (security and trust) and benefits (relationship and operational) are explored using 236 Chinese logistics service firms' perception of cloud computing adoption.

**065-1191 Ranking of Factors by Using IT2 Fuzzy FMEA for a Trucking Industry**
ku Il Dadsena, Student, Indian Institute of Technology Kharagpur, India
V N A naikan, Professor, Indian Institute of Technology Kharagpur, India
Sarada Sarmah, Professor, Indian Institute of Technology Kharagpur, India

The trucking industry plays a vital role in road freight transportation, because of its ease of accessibility. A systematic approach for factors identification and its ranking is required based on their criticality which affects performance. Ranking of the factors has been performed by using interval type 2 fuzzy FMEA approach.

**065-1598 Risk Management in Seaports**
Wolfgang Kersten, Professor, Hamburg University of Technology, Germany
Marius Indorf, Student, Hamburg University of Technology, Germany
Maren Wichmann, Student, Hamburg University of Technology, Germany

Beside cost and efficiency, major challenges of seaports are reliability, resilience, and safety & security of operations. Therefore, suitable risk management methods are absolutely essential to achieve the required level of performance. We investigate the application of risk management in seaports, analyze relevant conditions and derive potential areas of improvement.

**065-1932 Supply Chain Risk Management and Competitiveness in Latin America: Preliminary Findings**
Jorge Ayala-Cruz, Professor, University of Puerto Rico, United States
Roy Zuniga, Professor, INCAE, Costa Rica

We present preliminary findings of a comprehensive study on Latin American companies' current SCRM efforts. ISO 31000 risk assessments and treatment strategies guidelines were used in the development of a research survey. From the supply chain strategy perspective, the study demonstrates that SCRM initiatives are positively correlated with supply chain's performances.

**065-0365 A Target-Driven Approach Based on an Aspirational Measure**
Bin Zhu, Student, Tsinghua University, China
Yong Liang, Assistant Professor, Tsinghua University, China
Jian Chen, Professor, Tsinghua University, China

In this paper, we propose a target-driven approach to deal with the problem of choice under uncertainty. With the approach, the decision makers’ risk preference can be derived by their targets. We show some promising properties for our approach compared to the traditional methods.

**065-0646 Logistic Network Design with Closedown Costs**
Bo van der Rhee, Professor, Nyenrode University, Netherlands

We solve a multi-stage, multi-product allocation problem for a company that receives goods from the US and distributes throughout Europe. We select seven possible warehouse locations and explicitly take into account the closing down costs of existing warehouses. We show that the aggregate solution method finds the globally optimal solution.

**065-0381 Manufacturer Rebate Competition in a Supply Chain with a Common Retailer**
Albert Ha, Professor, Hong Kong University of Science & Tech, Hong Kong
Weixin Shang, Associate Professor, Lingnan Univ, China
Yunjie Wang, Student, Hong Kong University of Science & Tech, Hong Kong

We consider manufacturer rebate competition in a supply chain with two manufacturers selling substitutable products to a common retailer. We characterize the manufacturers' equilibrium rebate decisions and show how they depend on several key factors. We also consider the case when the retailer subsidizes the manufacturers to offer rebate.

**065-0339 How Is Car Market Share Related with "Green" Indices? -An Empirical Study**
Kejiu Hu, Student, Northwestern University Kellogg School o, United States
Sunil Chopra, Professor, Kellogg School of Management, United States
We studied carmakers’ strategies in choosing vehicle emissions levels by analyzing a 14-year on-road vehicle emission study in the European market. The results suggest different strategies are adopted based on the original emissions performance, future changes in the emissions standards, and the carmakers’ market power.

**065-0427** How Learning From Inspections Affects Environmental Outcomes: Evidence From Unconventional Drilling
Vidya Mani, Assistant Professor, Penn State University University Park, United States
Suresh Muthulingam, Assistant Professor, Penn State University State College, United States
Manufacturing firms increasingly face environmental inspections that determine whether their operations comply with environmental regulations. We investigate how firms learn from their inspection experiences as well as from the experiences of other firms. We identify the characteristics of the inspection experience that enable firms to improve their environmental performance.

**065-0645** New Business Models for Industrial Park Operators: An Analytical Approach
Ioannis Siskos, Student, Kuehne Logistics University, Germany
Luk van Wassenhove, Professor, INSEAD, France
Industrial parks operators (IPOs) are interested in symbiotic projects developed in their parks. We use static monopoly and competition modelling in order to explore the cost and pricing conditions under which by-product synergies that are not realized by the candidate firms would be undertaken by the IPO.

**065-0709** Pro-Environmental Job Behavior
Kenneth Schultz, Professor, Air Force Institute of Technology, United States
James Cotton, Student, Air Force Institute of Technology, United States
Reidar Hagtvedt, Associate Professor, University of Alberta, Canada
Joshua Strakos, Assistant Professor, Air Force Institute of Technology, United States
What are the drivers of pro-environmental job behavior? Holding organizational rewards and punishments equal, what motivates people to perform their jobs in an environmentally friendly manner? We survey pilots in the U.S. Air Force and correlate motivators with historical records of pilot fuel behavior.

**065-0558** Market Penalties and Long-Term Operating Performance Impacts of Product Recalls: The Role of Firm Disclosure
Tracy Johnson-Hall, Assistant Professor, College of William & Mary, United States
David Hall, Assistant Professor, Wright State University, United States
Recalls of food products are a concern for producers, consumers and policy-makers. Using an event study methodology, we examine the market penalty for food recalls by examining how the source (i.e. internal, supplier or contract manufacturer operations) of the quality failure recall impacts short-term shareholder value and long-term operating performance.

**065-0634** Supply Chain Information Sharing: Who Does It Benefit More?
Zhaojun Han, Student, Zhejiang University, China
Baofeng Huo, Professor, Zhejiang University, China
Yi Yang, Associate Professor, Zhejiang University, China
Xiaode Zhao, Professor, China Europe International Business School, China
We investigate how benefits of supply chain information sharing (SCIS) are allocated among supply chain parties. The results indicate that the receiving parties always benefit from IS, while the disclosing parties’ benefits are contingent. The results also find a transferable effect of customers’ IS with manufacturers on supplier performance.

**065-0807** Supply Chain Integration and Resilience: An Empirical Study of the Impact of Customer Leadership
Xingzhi Jia, Student, Texas A&M University College Station, United States
Xenophon Koufteros, Associate Professor, Texas A&M University College Station, United States
Anto Verghese, Assistant Professor, University of Houston, United States
We empirically examine whether customer leadership moderates the relationship between supply chain integration and resilience. We assert that transformational leadership (vis-à-vis transactional leadership) will enhance the relationship between supply chain integration and resilience.

**065-1627** The Impact of Justice on Power and Opportunism in Buyer-Supplier Relationships
Zhaojun Han, Student, Zhejiang University, China
Baofeng Huo, Professor, Zhejiang University, China
Yu Tian, Professor, Zhongshan University, China
We investigate how perceived justice by buyers influences their decision on the exertion of power and the subsequent effect of power on supplier opportunism. The results indicate that different dimensions of justice influence buyer power in different ways. Coercive power improves opportunism while non-coercive power decreases opportunism.

**065-1703** Signaling and Crime Prevention Theory in Purchasing and Supply Chain Management
Jillian Watson, Acquisition Program Manager, United States Transportation Command, United States
Aleda Roth, Professor, Clemson University, United States
Lawrence Fredendall, , Clemson University, United States
Kenneth Schultz, Professor, Air Force Institute of Technology, United States
This scenario-based experiment, anchored in Signaling and Crime Prevention Theory, explores whether or not purchasing personnel can detect signals of deceptive counterfeiters and successfully avoid them in a sourcing decision. We hypothesize that the level of counterfeit signaling will be positively related to supplier avoidance. This research is a first step in exploring the counterfeit phenomenon, a critical and contemporary supply chain security issue, from a proactive purchasing perspective.
### Socially Responsible Operations

**065-0116** Reshoring Manufacturing: Supply Availability, Demand Updating, and Inventory Pooling
- **Chair(s):** Eda Kemahlioglu-Ziya, Olga Perdikaki

**065-0136** Ensuring Corporate Social and Environmental Responsibility via Vertical Integration and Horizontal Sourcing
- **Bin Hu, Assistant Professor, University of North Carolina Chapel Hill, United States**
- **Adem Orsdemir, Assistant Professor, University of California Riverside, United States**

We empirically isolate the impact of quality concerns on consumers' willingness to pay (WTP) and the likelihood to purchase remanufactured products. Perceived risk, in the form of quality defects and cosmetic defects, has a significant impact on WTP, even after controlling for the WTP for new products, and other attributes.

**065-0126** Designing Sustainable Products under Co-Production Technology
- **Bora Keskin, Assistant Professor, Duke University Durham, United States**
- **Gilvan Souza, Professor, Indiana University Bloomington, United States**

We consider a manufacturer that takes a natural resource to make two products through co-production technology and markets the products to consumers, some of which additionally value sustainable products. We examine the impact of consumers' sustainability concern on the manufacturer's product line design decisions and resource consumption.

**065-1512** Recycling as a Strategic Supply Source
- **Gilvan Souza, Professor, Indiana University Bloomington, United States**

We investigate how recycling can be used as a strategic source of supply in the presence of competition and a powerful material supplier. We examine the economic and environmental impact of a manufacturer's decision to recycle its products and the implications for its customers, supplier, and society.

### Revenue Management and Pricing

**065-0422** Revenue Maximization for Cloud Computing Services
- **Gal Raz, Associate Professor, The University of Western Ontario, Canada**
- **Costis Maglaras, Professor, Columbia University, United States**

We study a stylized model of revenue maximization for cloud computing services. Using price data traces from Amazon, the largest cloud service provider, we examine the revenue maximization problem faced by the service provider with infinite capacity supplying a market with multiple customer types.

**065-1604** On Incomplete Learning and Certainty-Equivalence Control
- **Bora Keskin, Assistant Professor, Duke University Durham, United States**
- **Assaf Zeevi, Professor, Columbia University, United States**

Motivated by dynamic pricing applications, we consider a dynamic control-and-estimation problem. The decision-maker sequentially chooses controls and observes responses that depend on both the chosen controls and an unknown parameter. The decision-maker uses a certainty-equivalence policy, and we characterize the asymptotic accuracy performance of this policy.

**065-1622** Quality Consistent Pricing under the Nested Logit Model
- **James Davis, Assistant Professor, University of Illinois Urbana-Champaign, United States**
- **Huseyin Topaloglu, Associate Professor, Cornell University, United States**

We consider pricing problems where customers choose among products according to the nested logit model and there is a quality consistency constraint. The quality consistency constraint ensures that the posted prices of products reflect the quality of the products. We consider variations of this problem and provide polynomial time algorithms.

**065-1691** Learning in Online Optimization Using Thompson Sampling
- **Daniel Russo, Assistant Professor, Northwestern University, United States**

Thompson sampling is a simple but powerful approach to balance exploration and exploitation in complicated online optimization problems. I explain the algorithm, touch on recent theoretical results, and then show how it can be used to address interesting problems.

### Global Supply Chain Management

**065-0116** Reshoring Manufacturing: Supply Availability, Demand Updating, and Inventory Pooling
- **Chair(s):** Eda Kemahlioglu-Ziya, Olga Perdikaki
Existing literature on reshoring emphasizes demand responsiveness due to market proximity. We however note that limited onshore supply availability may force reshoring manufacturers to remain dependent on offshore suppliers. Accounting for this issue, we characterize scenarios wherein manufacturers prefer reshoring, and further identify operational strategies that can swing such preferences.

065-0117  To Share or Not to Share? Capacity Investments in a Shared Supplier
Anyan Qi, Assistant Professor, University of Texas Dallas, United States
Hyun-Soo Ahn, Professor, University of Michigan Ann Arbor, United States
Amitabh Sinha, Associate Professor, University of Michigan Ann Arbor, United States

We study firms' capacity decisions when multiple firms invest in a shared supplier. We find that firms generally pursue exclusivity, resulting in a prisoners’ dilemma; and that one firm may invest in first-priority capacity, allowing the others with exclusive capacity to free-ride. We also characterize the impact of market environment.

065-0307  Outsourcing under Competition: When to Choose a Competitor as a Supplier?
Eda Kemahlioglu-Ziya, Assistant Professor, North Carolina State University, United States
Olga Perdikaki, Assistant Professor, Texas A&M University College Station, United States

We study a supply chain with an OEM that could outsource either to an independent supplier or to an integrated firm that performs manufacturing in-house and competes with the OEM. We identify how different contractual relationships between the OEM and the firm it sources from affects the OEM’s supplier choice.

065-0806  An Economic Model of Knowledge Outsourcing
Jaeseok Lee, Student, Georgia Institute of Technology, United States
Cheryl Gaimon, Professor, Georgia Institute of Technology, United States
Karthik Ramachandran, Associate Professor, Georgia Institute of Technology, United States

We introduce a game-theoretic model of knowledge outsourcing. We study how the interaction between a knowledge buyer and supplier is affected by two salient aspects of knowledge outsourcing: absorptive capacity and the ability to reuse prior knowledge. We also investigate how uncertainty and information asymmetry influence the equilibrium outcomes.

065-2064  Practice Leaders Semi-Plenary Panel: Operational Challenges and Opportunities
Dino Petrarolo, Vice President, CCI Inc., United States
Anssi Kaki, Development Manager, UPM Ltd, Finland
Liang Lu, Lecturer, Heriot-Watt University, United Kingdom

This panel discussion will cover various operational challenges and opportunities by practice leaders from management consulting, energy, online retail, and the high-tech industries. This includes supply chain excellence and how companies should prepare for rapid developments in technology, information systems, supplier selection, and manufacturing 4.0. Their discussion will offer research opportunities for OM researchers.
### 065-0290 Experimentation to Design Food Relief Supply Chains

**Chair(s):** Aruna Apte, Keenan Yoho

#### Abstract

Laws, poor infrastructure, capital constraints, and shocks interact to make the design of food relief supply chains complex. Design of experiments (DOE) methods can be used to determine the efficacy of supply chain design decisions. This presentation considers examples from the World Food Program in Uganda and USAID globally.

---

### 065-0529 Inventory Management of Cholera Vaccinations in the Event of Complex Natural Disasters

**Chair(s):** Aruna Apte, Jordan Goentzel

#### Abstract

Government and NGO first responders must consider epidemic outbreaks as a threat to mitigate in Humanitarian Aid/Disaster Relief (HA/DR) scenarios. We develop and test an inventory management model to optimize the stock of vaccinations for cholera, which often arises as a secondary effect in the aftermath of natural disasters.

---

### 065-0706 Modeling Disruption in a Fresh Produce Supply Chain

**Chair(s):** Chen Yau

#### Abstract

Fresh produce supply chains are highly vulnerable to contamination. We present a mathematical model of a fresh produce supply chain in order to explore how the interplay of different factors impacts vulnerability. The model is applied to the E. coli contamination in spinach in 2006.

---

### 065-0862 Financing Supply Chains in Developing Countries

**Chair(s):** Tim Breitbach

#### Abstract

We examine how consumer goods supply chains are financed in developing countries. The focus is on how the business model impacts go-to-market and financing strategies as measured by the effect on working capital requirements, profit, and the ability of companies to scale operations.

---

### 065-0584 Analysis of Capabilities of Organizations for Humanitarian Operations

**Chair(s):** Aruna Apte, Bryan Hudgens

#### Abstract

The United States Navy and a variety of NGOs provide substantial disaster relief due to their respective capabilities. We provide financial analysis and operational analysis based on SPHERE criteria to suggest ways in which the two sectors can leverage their capabilities to enhance disaster relief efforts.

---

### 110 Session: Advances in Supply Chain Management

**Chair(s):** Shiliang Cui

#### Abstract

We study the optimal local content requirement decisions of a developing economy when it faces cost disadvantages in manufacturing a multi-component product, due to lack of technical know-how.

---

### 065-0324 Optimizing Local Content Requirement under Technology Gaps

**Chair(s):** Shiliang Cui

#### Abstract

We experimentally study how trust and social networks influence forecast information sharing behavior among executives with an average 17 years of professional experience. We demonstrate how trust pre-conditioned by prior experiences and trust measured from social network jointly influence information sharing behavior and the resulting supply chain efficiency.

---

### 065-1712 Technology Sharing in Two-Sided Markets

**Chair(s):** Ozgur Yasar

#### Abstract

We investigate the drivers behind Tesla's decision to make its patents freely available to other electric car manufacturers. We show under what conditions subsidizing the competitors can be profitable for the firm.

---

### 112 Session: Operations Management in Patient Care Delivery

**Chair(s):** Craig Froehle

#### Abstract

We examine the profitability of the Tesla electric car in the context of the current market landscape and its competitors. The Tesla model is analyzed through a variety of lenses, including cost, efficiency, and consumer behavior.
Optimal patient streaming based on patient characteristics and system occupancy can improve flow in emergency departments with a fast track. Accommodating non-stationarity in arrival rates presents a modeling challenge. We use MDP and simulation-based optimization to identify the optimal patient routing policy at any time in an emergency department.

**Enhancing the Impact of Healthcare Information Technology: Caregiver Learning Rates**

Luv Sharma, Student, Ohio State University, United States
Aravind Chandrasekaran, Associate Professor, Ohio State University, United States
Kenneth Boyer, Professor, Ohio State University, United States

We examine the effect of department-level incentives and individual learning rates, and their interactions with HIT implementation. We combine archival secondary data regarding HIT adoption with primary survey data on individual learning behaviors and organizational incentives from about 50 nurses.

**Improving Patient Access and Adherence to an Endocrine Program**

Moses Yu Hei Chan, Student, University of Michigan Ann Arbor, United States
Amy Cohn, Associate Professor, University of Michigan Ann Arbor, United States
Pranjal Singh, Student, University of Michigan - Ann Arbor, United States

A weight management program was designed to promote weight loss for morbidly obese patients. However, providers are booked weeks out, posing a challenge for schedule-intensive recurring visits. Non-adherence to the schedule undermines the effectiveness of the program. We conduct a study to improve patient access and adherence.

**Patient Reevaluation and Waiting Time in Emergency Departments**

Michael Ward, Assistant Professor, PHYSICIAN, United States
Craig Froehle, Professor, University of Cincinnati, United States

Initial patient presentation affects the intensity of ED resources allocated throughout the patient's entire visit. Scheduled reevaluation of patients in the ED, and their reallocation to more appropriate levels of care, is hypothesized to improve patient flow and reduce waiting. Discrete-event simulations using datasets from practice reveal this policy's effects.

**The Operational Effects of Information Overload on Clinical Decision-Making**

Lauren Laker, Assistant Professor, Xavier University, United States
Craig Froehle, Professor, University of Cincinnati, United States
Christopher Lindsell, Professor, University of Cincinnati, United States
Jaimie Windeler, Assistant Professor, University of Cincinnati, United States

Our research introduces and tests "emphasis framing" as an operational tactic to mitigate the effects of information overload on the quality and timeliness of clinical decision-making. Our results show that emphasis framing improved the quality of decision-making, and that decision-making took longer with an emphasis frame.

**Effect of Strategic Goals on Operational Level Performance**

Claire Senot, Assistant Professor, Tulane University, United States

We investigate the interplay between strategic priorities and operational performance in U.S. acute care hospitals.

**A Dynamic Model of Centralized vs. Decentralized Process Improvement**

Edward Anderson, Professor, McCombs School of Business, United States

Vigorous debate exists in process improvement circles between the proponents of decentralized methodologies in which line workers lead process improvement locally and advocates for more centralized organization-wide approaches. To explore this question, we build a system dynamics model to explore under what conditions each approach works best.

**Understanding the Impact of Meaningful Use on Quality of Care: A Perspective From Patient Safety Culture**

Xin Ding, Associate Professor, University of Houston, United States

Built on the resource-based perspective, our study explores the moderating role of patient safety culture on the connection between meaningful use and quality of care. Multiple data sources from health agencies and Leapfrog were utilized in testing the moderating effect with over 1,000 acute-care hospitals.

**The Relationships Among Quality of Care Dimensions: Empirical Evidence From U.S. Hospitals**

Aber Elsaleiby, Assistant Professor, Purdue University, United States
P.S Sundararaghavan, Professor, University of Toledo, United States
Yue Zhang, Assistant Professor, University of Toledo, United States

Our research explores the relationship between process quality offered by hospitals and outcome quality (unplanned readmission and mortality rates). In particular, we investigate the influence of structural quality and patient-centered care on this relationship using data from the Centers for Medicare and Medicaid Services.

**A Perceptual Map of Similarities of Individual Activities for Elderly Patients with Impaired Eyesight**

Antonio Silva, Student, University of Sao Paulo, Brazil
Maria Gouvea, Associate Professor, University of Sao Paulo, Brazil
Understanding the Behavioral Drivers of Execution Failures in Retail Supply Chains

Jonathan Beebe, Student, Boston University, United States
Janelle Heineke, Professor, Boston University, United States

Satisfaction is often understood through an expectations-disconfirmation lens in which customers' expectations are compared with the services delivered. However, for chronically ill patients, prior expectations about treatment may be difficult to set, complicating the notion of satisfaction. Our paper applies a "balance" approach for understanding satisfaction in this context.
We conduct a real-effort experiment in virtual reality to understand how product similarity influences execution in a retail environment. We find that performance declines considerably when products are similar. Making products easier to distinguish or adding a visual cue improves retail execution.

Retailers often solicit assistance from manufacturers to help them make better-informed store level retailing decisions. We experimentally investigate whether and how the process through which the manufacturer provides assistance affect trust, trustworthiness and channel performance.

Dominant retailers, such as Amazon.com and Sears.com, allow small retailers to sell on their online marketplaces and offer fulfillment services. We investigate the benefit of such fulfillment services and study the optimal fulfillment fees to charge.

Frequently, consumers may need to physically experience a product in order to assess its valuation. We consider how such uncertainty can affect the equilibrium pricing and assortment choices among competing retailers. We show how the structure of a retailer's pricing pattern depends on the assortments and search costs.

We study information sharing in a supply chain consisting of an upstream supplier selling products through two competing downstream retailers. We examine different information sharing scenarios and find that the full information sharing equilibrium is more likely to occur when the supplier is informed.

Selling on an e-commerce market platform, such as Alibaba, has strategic and operational consequences for a retailer. Alibaba's $14.3 million in sales creates opportunity, but retailers must commit to prices and quantities a priori. We evaluate the benefits of joining the platform under different conditions.

Case Mix Planning is the key driver of a hospital's revenues and utilization of downstream resources such as bed space. We present a two-phase iterative approach to improve scheduling practices by incorporating uncertain patient demand, staff resource constraints, and downstream ward capacity.

Incorporating patient centered medical home (PCMH) principles, we develop an adaptive appointment scheduling model for a primary care setting. We propose a simulation optimization approach to sequentially schedule appointments to provide desirable schedules from the perspective of both patients and the medical practice. We provide experimental results and managerial insights.

Patient satisfaction in recovery units is highly correlated with inpatient experience - a factor highly impacted by the patient's assigned room type and his/her nurse's specialty. However, uncertain patient arrival times into emergency departments frequently require shared resources. Mismatch between unit and patient service type can cause patient dissatisfaction and lead to unnecessary delays and transfers. SAS Simulation Studio is used to address this problem.
Friday, 03:15 PM - 04:45 PM

**Track: Empirical Research in Operations Management**

**Chair(s):** Xiaosong Peng

**065-0128** Factors Affecting Supply Chain Performance in Hospitals

Arunachalam Narayan, Assistant Professor, University of Houston, United States
Xiaosong (David) Peng, Associate Professor, University of Houston, United States

Several studies have identified the material cost to be one of the biggest expenses in hospitals and there has been a constant drive for efficiency in hospital supply chains. Through a large-scale study, we identify the factors that drive hospital supply chain excellence.

**065-0166** Small Businesses Innovate for NIH Awards: To Partner or Not?

Mengyang Pan, Student, Ohio State University, United States
James Hill, Associate Professor, Ohio State University, United States
Aravind Chandrasekaran, Associate Professor, Ohio State University, United States
Johnny Rungtusanatham, Professor, Ohio State University, United States

We analyze how small businesses decide between SBIR and STTR programs (i.e., to partner or not) and, given their choices, how they can successfully move the funded innovation forward to commercialization. Our findings suggest the decision to partner or not is influenced by factors beyond a firm's individual experience.

**065-0168** Impact of Hybrid Hospital Admissions Policy on Poor Rural Patients in China

Xitong Guo, Associate Professor, Harbin Institute of Technology, China
Tianshi Wu, Assistant Professor, Harbin Institute of Technology, China
Gregory Heim, Associate Professor, Texas A&M University College Station, United States
Ram Janakiramani, Associate Professor, University of South Carolina, United States

Healthcare poses serious burdens for poor rural citizens in China. Some hospitals introduced patient-centric policies to reduce burdens leading to poor care delivery. We perform econometric analyses on hospital operational data to examine admissions policy changes and patient-centric operating formats pertinent to improving health of underserved patient populations.

**065-0167** Estimation of Resource Allocation Patterns in a Portfolio of Engineering Projects

Vishwanth Hegde, Professor, California State University East Bay, United States
Zinovy Radovinsky, Professor, California State University East Bay, United States

Using historic resource loading data in a multi-project setting, we show that resource distribution patterns can be captured by parametric regression models, which can be used to forecast resource distribution during project lifetime using project characteristics. We discuss the managerial insights and their implications on the resource planning in project portfolios.

**065-1075** Technology Migration of Service Providers: The Case of an iPhone Launch

Yan Dong, Assistant Professor, Moore School of Business, University of South Carolina, United States
Chen Zhou, Assistant Professor, University of South Carolina, United States
Moonwon Chung, Student, University of South Carolina, United States

We explore the market wide impact of an iPhone launch on technology migration at both the country level and firm customer portfolio level. We use data from wireless telecommunication service providers to empirically study how the iPhone launch affected the technological transitions and downstream retail profitability.

**Track: Scheduling and Logistics**

**Chair(s):** Peijun Guo

**065-1049** Processing Time Weighted Production Lead Time: Does This Priority Rule Make Any Sense?

Heinrich Kuhn, Professor, Cath. University Eichstaett Ingolstadt, Germany
Sandro Kühn, Student, Catholic University of Eichstaett-Ingolstadt, Germany

Certain priority rules (SPT, FCFS, EDD) are beneficial in respect of specific goals. However, the recently suggested rule "processing time weighted production lead time," remains unaffected by the job sequence in the single machine case. The rule is analyzed in the single and multi-machine case and new proofs are presented.

**065-0091** Dynamic Order Scheduling Under Evolution of Demand Forecasts

Isik Bicer, Lecturer, Swiss Federal Institute of Technology in Lausanne, Switzerland
Ralf Seifert, Professor, IMD, Switzerland

We develop a dynamic programming model that optimizes production schedules under evolutionary demand risk. We apply our model to the Reebok case and compare our results with a static scheduling policy. We show that our model outperforms the static policy, leading to a significant increase in profits.

**065-1900** Study On Disruption Management Approach For Hot Working Scheduling Problem In Manufacturing Supply Chain

Hong-kuang Bo, Associate Professor, Institute of Production Operation and Logistics Management, China
Hai-feng Liu, Student, Institute of Production Operation and Logistics Management, China
Zhan-cheng Li, Student, Institute of Production Operation and Logistics Management, China
Long-long Li, Student, Institute of Production Operation and Logistics Management, China

We investigate a hot working scheduling problem for an anticipated machine disruption in manufacturing supply chain environment. A novel scheduling model and a heuristic hybrid algorithm based on disruption management is presented. The results of numerical experiments indicate that the scheduling model and algorithm is effective.

**065-0386** Production Planning Problems Under Uncertainty With The One-Shot Decision Theory

Xide Zhu, Ph.d student, Yokohama National University, Japan
We consider that a manufacturer is planning to produce multiple innovative products with uncertain market information. A scenario-based optimization model is built with the one-shot decision theory. The proposed model is a bi-level programming problem with a non-smooth lower level problem. An efficient approach is proposed to solve it.

### Consumer Markets for Remanufactured and Refurbished Products

Chair(s): Erin McKie

James Abbey, Assistant Professor, Texas A&M University College Station, United States
Meg Meloy, Professor, Penn State University State College, United States
Joseph Blackburn, Emeritus Professor, Vanderbilt University, United States
Daniel Guide, Professor, Penn State University University Park, United States

Consumer returns are approaching three-hundred billion dollars annually. Managers have a multi-billion-dollar opportunity to reuse the products. Yet, remanufacturing has multiple barriers that must be understood. First, will consumers buy remanufactured products? Second, will the green consumer segment such products? Third, will remanufactured product sales cannibalize new product sales?

### The Value of Competition in Remanufacturing

Chair(s): Narendra Singh, Assistant Professor, Indian School of Business, India

Ravi Subramanian, Associate Professor, Georgia Institute of Technology, United States
Kanthik Ramachandran, Associate Professor, Georgia Institute of Technology, United States

We study an OEM’s product strategy when the OEM offers a new product that depreciates over time and consumers are strategic. The OEM competes with a third-party remanufacturer for acquisition and remanufacturing of the depreciated products. We study how competition from the third-party remanufacturer affects the OEM.

### New Versus Refurbished: Key Factors That Influence Consumers' Choices

Chair(s): Erin McKie, University of South Carolina, United States

Mark Ferguson, Professor, University of South Carolina, United States
Michael Galbreth, University of South Carolina, United States
Sriram Venkataraman, Assistant Professor, University of South Carolina, United States

Remanufacturing is increasingly providing new profit opportunities for firms, as well as more product condition options - such as new, refurbished, and used - for consumers to choose. Using secondary data and choice model analysis techniques, we estimate the influence of various factors on consumers’ purchasing decisions.

### Online Inventory Disclosure: The Impact of How Consumers Perceive Information

Chair(s): Noam Shamir

Toiga Aydinliyim, Assistant Professor, Baruch College, United States
Michael Pangburn, Associate Professor, University of Oregon, United States
Elliot Rabinovich, Professor, Arizona State University Tempe, United States

Given varied consumer perceptions of inventory information, online retailers’ presentation of such information influences purchase behavior. We investigate optimal inventory disclosure policies assuming two distinct consumer segments: savvy consumers who can predict a retailer’s stock levels (even when masked) and naïve consumers who rely on prior (stochastic) beliefs regarding inventory.

### Financial Cross-Ownership and Information Leakage in a Supply-Chain

Chair(s): Noam Shamir

Noam Shamir, Assistant Professor, Tel Aviv University, Israel
Yossi Aviv, Washington University St Louis, United States

Financial cross-ownership describes a situation in which one retailer holds non-voting shares of a competing retailer. We study the way financial cross-ownership affects operational decisions, such as production quantity and information acquisition, in a supply-chain comprised of two competing retailers that source a product from a mutual supplier.

### Accuracy of Demand Forecasting and Its Impact on Sharing Forecasts

Chair(s): Jonathan Whitaker

Hyoduk Shin, Associate Professor, University of California San Diego, United States

We investigate the role of accuracy information of demand forecasts on sharing forecasts within the supply chain between the downstream retailer and the upstream supplier. We demonstrate how the uncertainty on the forecast accuracy can help or hurt the ability to share demand forecasts.

### Designing Feature-Limited Demonstration Software: Choosing the Right Features to Include

Chair(s): Jonathan Whitaker

Joysthika Ray, Student, University of Texas Dallas, United States

Hyoduk Shin, Associate Professor, University of California San Diego, United States

We study an OEM’s product strategy when the OEM offers a new product that depreciates over time and consumers are strategic. The OEM competes with a third-party remanufacturer for acquisition and remanufacturing of the depreciated products. We study how competition from the third-party remanufacturer affects the OEM.

### New Versus Refurbished: Key Factors That Influence Consumers' Choices

Chair(s): Erin McKie, University of South Carolina, United States

Mark Ferguson, Professor, University of South Carolina, United States
Michael Galbreth, University of South Carolina, United States
Sriram Venkataraman, Assistant Professor, University of South Carolina, United States

Remanufacturing is increasingly providing new profit opportunities for firms, as well as more product condition options - such as new, refurbished, and used - for consumers to choose. Using secondary data and choice model analysis techniques, we estimate the influence of various factors on consumers’ purchasing decisions.

### Online Inventory Disclosure: The Impact of How Consumers Perceive Information

Chair(s): Noam Shamir

Toiga Aydinliyim, Assistant Professor, Baruch College, United States
Michael Pangburn, Associate Professor, University of Oregon, United States
Elliot Rabinovich, Professor, Arizona State University Tempe, United States

Given varied consumer perceptions of inventory information, online retailers’ presentation of such information influences purchase behavior. We investigate optimal inventory disclosure policies assuming two distinct consumer segments: savvy consumers who can predict a retailer’s stock levels (even when masked) and naïve consumers who rely on prior (stochastic) beliefs regarding inventory.

### Financial Cross-Ownership and Information Leakage in a Supply-Chain

Chair(s): Noam Shamir

Noam Shamir, Assistant Professor, Tel Aviv University, Israel
Yossi Aviv, Washington University St Louis, United States

Financial cross-ownership describes a situation in which one retailer holds non-voting shares of a competing retailer. We study the way financial cross-ownership affects operational decisions, such as production quantity and information acquisition, in a supply-chain comprised of two competing retailers that source a product from a mutual supplier.

### Accuracy of Demand Forecasting and Its Impact on Sharing Forecasts

Chair(s): Jonathan Whitaker

Hyoduk Shin, Associate Professor, University of California San Diego, United States

We investigate the role of accuracy information of demand forecasts on sharing forecasts within the supply chain between the downstream retailer and the upstream supplier. We demonstrate how the uncertainty on the forecast accuracy can help or hurt the ability to share demand forecasts.

### Designing Feature-Limited Demonstration Software: Choosing the Right Features to Include

Chair(s): Jonathan Whitaker

Joysthika Ray, Student, University of Texas Dallas, United States
### 065-2083 Electronic Finance in the Digital Age: Impact on Operations management in Financial Institutions

Krishnan Dandapani, Professor, Florida International University, United States

We identify the implications for financial institutions operations of E-finance in five key operations management areas. We explore the Digital and Cryptocurrencies and payment systems, Cloud developments in financial services and internet of things, Valuation issues of multi-sided platforms, Algorithmic, High-frequency and Quantum trading implications and Cyber security Costs, Benefits and Insurance.

### 065-1956 Does IT Complement or Substitute for Physical Branches? Evidence from the Financial Services Industry

Terence Saldanha, Assistant Professor, Washington State University Pullman, United States
Abhishek Kathuria, Assistant Professor, University of Hong Kong, Hong Kong
Jiban Khuntia, Assistant Professor, University of Colorado Denver, United States
Sunil Mithas, Professor, University of Maryland, United States

We examine whether IT substitutes or complements physical branches. We conceptualize three types of IT: core Banking IT (BIT), B2B Transaction IT (BTIT), and Customer access IT (CAIT). We theorize that BIT and BTIT complement branches, whereas CAIT substitutes branches. Our data analysis of US credit unions supports our hypotheses.

### 065-1999 Ambidextrous Interventions to Manage Trade-Offs in Innovation Outcomes: Evidence from a Large Conglomerate

Sunil Mithas, Professor, University of Maryland, United States
Jonathan Whitaker, Associate Professor, University of Richmond, United States
Shirish C. Srivastava, Associate Professor, HEC Paris, France
Ravi Arora, Vice President, Tata Sons, India
Dongwon Lee, Student, University of Maryland, United States

We theorize the influence of four innovation-related managerial interventions (strategic clarity, reward metrics, task autonomy, firm resources) on two innovation-related outcomes (faster innovation rollout, industry-leading innovations), and empirically test our proposed model using data from 5,600+ respondents belonging to 16 business units of a large multinational conglomerate headquartered in India.

---

**Friday, 03:15 PM - 04:45 PM**

**Track:** Innovation, Learning and Technology Management

<table>
<thead>
<tr>
<th>Session: Learning in Product Development and Innovation</th>
<th>Chair(s): Jennifer Bailey</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-1047 Stochastic Assignment with Individual Learning</td>
<td>Silviya Valeva, Student, University of Iowa, United States</td>
</tr>
<tr>
<td>Mike Hewitt, Assistant Professor, Loyola University of Chicago, United States</td>
<td></td>
</tr>
<tr>
<td>Barrett Thomas, Associate Professor, University of Iowa, United States</td>
<td></td>
</tr>
</tbody>
</table>

Explicitly modeling human learning in task assignment problems offers great opportunities for better decision making that can result in increased revenue and strategic workforce specialization. We present and compare the performance of several assignment models that incorporate both learning through experience and uncertainty in demand.

### 065-1625 Learning from Analyzing Failure: Intra- and Inter-Organizational Learning in the Medical Device Industry

Jennifer Bailey, Assistant Professor, Babson College, United States
Ruben Mancha, Assistant Professor, Babson College, United States

We explore whether firms benefit from intra- and inter-organizational learning when developing new products. Organizations can derive informational value from analyzing their own prior failure experiences and from the failures of others. We examine this phenomenon in the context of learning from data-rich product recalls in the medical device industry.

### 065-1670 The Effect of Technology Learning on the R&D Efficiency of IT Industries

Li-Ting Yeh, Assistant Professor, Chung Yuan Christian University, Taiwan, Republic of China
Dong-Shang Chang, National Central University, Taiwan, Republic of China

We develop an integrated approach that incorporates latent technological learning effects into the data envelopment analysis model. This study uses our approach to evaluate firms’ R&D in IT industry. The result demonstrates that it is appropriate to integrate the technological learning effect into evaluations of R&D efficiency.

---

**Track:** Manufacturing Operations

<table>
<thead>
<tr>
<th>Session: Advances in Manufacturing and Supply Chain Operations</th>
<th>Chair(s): Qipeng Zheng</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-0738 The Impact of Recyclability on Greenhouse Gas Emissions and Related Cost</td>
<td>Hailong Cui, Student, University of Southern California, United States</td>
</tr>
<tr>
<td>Greys Sosic, Associate Professor, University of Southern California, United States</td>
<td></td>
</tr>
</tbody>
</table>

We evaluate the impact of recyclability on emissions through a product’s life cycle and derive conditions for reduction of long-run average emissions. We investigate the underlying costs imposed on the supply chain and on society to understand optimal decisions for decentralized (manufacturer or government-driven recycling) and centralized cases.

### 065-1639 A Multistage Stochastic Model for Natural Gas Contract and Maintenance Scheduling of Power Plants

Qipeng Zheng, Assistant Professor, University of Central Florida, United States
**065-1769**  The Big Data Newsvendor: Practical Insights from Machine Learning  
Gah-Yi Vahn, Assistant Professor, London Business School, United Kingdom  
Cynthia Rudin, Associate Professor, Massachusetts Institute of Technology, United States

We investigate the newsvendor problem when one has $n$ observations of $p$ features related to the demand, as well as historical demand data. We propose two approaches to finding the optimal order quantity in this new setting - that of Machine Learning (ML) and Kernel Optimization (KO).

**065-0809**  Green Sourcing: The Role of Premium Sharing and Consulting Services  
Xi Chen, Assistant Professor, University of Michigan Dearborn, United States  
Niyazi Taneri, Assistant Professor, Singapore University of Technology and Design, Singapore  
Saif Benjaafar, Professor, University of Minnesota, United States

Certified sustainable products oftentimes enjoy a significant green premium in the retail market. We study a retailer's use of premium sharing and consulting service provisions in sourcing contracts as a tool that incentivizes suppliers to exert greening efforts, which improves the chances of receiving certification.

<table>
<thead>
<tr>
<th>Session: Consumer Behavior</th>
<th>Track: Behavior in Operations Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>127</strong></td>
<td>Xu Guan</td>
</tr>
</tbody>
</table>

| 065-0430  | How Can Consumers Help Minimize Waste In The Food Supply Chain?  
Emel Aktaş, Senior Lecturer, Cranfield University, United Kingdom  
Zeynep Topaloglu, Assistant Professor, Georgetown University, Qatar  
Amir Sharif, Professor, Brunel University, United Kingdom  
Zahir Irani, Professor, Brunel University, United Kingdom  
Samsul Huda, Associate Professor, University of Western Sydney, Australia  
Qatar imports more than 90% of the food consumed in the country. Yet, half of the bin is food. We conduct an exploratory research with consumers to identify top factors leading to food waste: Culture, buying behavior, personal tastes, disconnect between food on the plate and where it comes from. |

| 065-0657  | Supplier Competition: Theory vs. Experiment  
Roger Blake, Assistant Professor, University of Massachusetts Boston, United States  
Ehsan Elahi, Associate Professor, University of Massachusetts Boston, United States  
We use laboratory experiment to investigate the decisions made by competing suppliers in an outsourcing setup. Our results show the suppliers’ decisions are significantly different from the Nash equilibrium. To explain this deviation, we examine the impact of three behavioral factors: loss aversion, rival chasing, and the gamesmanship behavior. |

| 065-0129  | Taking the Plunge: An Investigation of Drivers and Inhibitors of Initial In-Game Purchase  
Mei Li, Assistant Professor, University of Notre Dame, United States  
Hong Guo, Assistant Professor, University of Notre Dame, United States  
In-game purchases represent a key source of revenue for game developers. In this paper, we use Critical Incident Technique to collect and analyze qualitative data on consumers’ initial in-game purchase scenarios and identify key drivers and inhibitors. Our research sheds light on developer's game design and marketing strategies. |

| 065-1881  | Information Disclosure with Reference-Dependent Consumers  
Xu Guan, Student, Wuhan University, China  
Yulan Wang, Assistant Professor, Hong Kong Polytechnic Univ, Hong Kong  
Ying-Ju Chen, Associate Professor, Hong Kong University of Science & Tech, Hong Kong  
We investigate a seller's voluntary disclosure strategy to two consumers who arrive sequentially and are reference-dependent on product quality. The seller decides whether to disclose his private quality information to the early adopter and has to rely on this consumer to disseminate her quality assessment to the follower. |

<table>
<thead>
<tr>
<th>Session: Experience, Psychology, and Emotion in Service Operations</th>
<th>Track: Service Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>128</strong></td>
<td>Michael Dixon</td>
</tr>
</tbody>
</table>

| 065-2028  | Examining Links Between Service Design and Performance in High-Anxiety Settings  
Michelle Shell, Student, Harvard University, United States  
Ryan Buell, Professor, Harvard University, United States  
Many service settings are rife with anxiety, yet the impact of anxiety on service relationships is not well understood. Through a series of experiments, we find that providing self-service customers with access to human contact in high-anxiety settings can improve choice satisfaction, and in turn their trust in the company. |

| 065-2029  | Role of Humor in Service Interactions  
Sriram Dasu, Associate Professor, University of Southern California, United States  
Brands pursue humor in their advertising, but they rarely do so in a planned way in customer service interactions. Likewise, although people pursue humor in their social interactions, they rarely do so in customer service interactions. In this talk we explore the potential role humor can play in service interactions and the underlying theories. |

| 065-1791  | Balanced, Yet Unstable? Understanding Stability of Service Triads  
Sourav Sengupta, Student, IITB-Monash Research Academy, Australia  
Tarikere Niranjan, Assistant Professor, Indian Institute of Technology Bombay, India  
We explore the potential role humor can play in service interactions and the underlying theories.
**Friday, 03:15 PM - 04:45 PM**

**129**

**Friday, 03:15 PM - 04:45 PM, Poinsettia**

**Session:** Financing models in Operations

**Chair(s):** Sreekumar Bhaskaran

**065-0843** Bank Operations and Lending Cost: Evidence From the Microloan Market  
Yuqian Xu, Student, New York University, United States  
Yin Chen, Student, Harvard University, United States  
Bingqing Xiao, Associate Professor, Nanjing University, China

We consider the impact of relationship lending on microloan interest rate pass-through. We find that a relationship between the bank and firm actually facilitates the bargaining power of the borrower and thus obstructs the monetary policy on bank loans to non-financial firms. We also investigate the role of a physical distance in the transmission of soft information.

**065-1722** Labor Welfare in the Sharing Economy  
Saif Benjaafar, Professor, University of Minnesota, United States  
Guangwen Kong, Assistant Professor, University of Minnesota, United States  
janyang ding, Student, University of Minnesota, United States

We consider a platform, such as Uber, that relies on a self-employed and self-scheduled workforce to provide a service. Workers vary in their availability and their valuation of their time. We examine resulting wage rates and employment and income levels.

**130**

**Friday, 03:15 PM - 04:45 PM, Quince**

**Session:** Innovations in Teaching Operations Research/Management Science Courses/Topics

**Chair(s):** Shailesh Kulkarni

**065-0861** Dynamic Interactive Visualizations: Implications of Seeing, Doing, and Playing  
Shailesh Kulkarni, Associate Professor, University of North Texas, United States  
Yasaman Amirkiae, Student, University of North Texas, United States  
Bin Mai, Assistant Professor, University of North Texas, United States  
Hakan Tarakci, Assistant Professor, University of North Texas, United States

Teaching relatively complex quantitative topics in Statistics, OM and OR/MS to undergraduate as well as graduate students can pose numerous pedagogical challenges. However, several topics in these disciplines are amenable to ease of exposition by means of dynamic interactive visualizations. We present and discuss a sample of such visualizations.

**065-1471** Does Increased Student Engagement Affect Learning Outcomes? Results from a Quantitative Analysis Course  
Thomas Sloan, Associate Professor, University of Massachusetts Lowell, United States

To help introduce new topics, students in an undergraduate quantitative analysis course answered introductory, pre-class questions using a web-based application called ForClass. Performance on various exam questions are tracked for two groups: one using the app, and the other not. Can the performance differences be attributed to increased engagement?

**065-1671** Incubation Model of Science and Entrepreneurship to Generate Intellectual Property: Case Congress of Economics  
Taria Andino Ruiz, Student, National Autonomous University of Honduras, Honduras

We present the implementation of a model of incubation for the production of innovations and research of value added from the initiative of the Congress of Economy, Management and Technology (CEAT). We describe its methodology, marketing, logistics, and linking, among other aspects that allow this project to continue providing and promoting the academy.
065-1170 Using Simulation to Test Supply Chain Design Strategies for Innovative Versus Functional Products
Lance Saunders, Assistant Professor, Virginia Commonwealth University, United States
Jason Derrick, Professor, Virginia Commonwealth University, United States
Mary Holcomb, Professor, University of Tennessee Knoxville, United States

Supply chain design variables such as inventory, lead time, and manufacturing utilization should differ for functional versus innovative products. We present the results of a multi-tiered simulation model based on industry data integrating a decoupling point to understand relationships between these variables as well as which have the most impact on performance.

Yvonne Kreis, Assistant Professor, University of Mainz, Germany
Wendy Tate, Associate Professor, University of Tennessee Knoxville, United States
Lydia Bals, Professor, University of Applied Sciences, Germany

Supply chain research still mainly centers on physical material flows. The relationships between the material, information, and financial flows have not yet been researched in detail (Carter, Rogers & Choi, 2015). We utilize the (financial) capital market restrictions in Greece during 2015 to study the interrelationships between these flows.

065-1600 An Environmental Disaster: Insights for Samarco’s Supply Chain
Wendy Tate, Associate Professor, University of Tennessee Knoxville, United States
Verica Paula, Professor, Uberlandia Federal University, Brazil
Veronica Paula, Professor, Uberlandia Federal University, Brazil

In November 2015, Tailings Dam collapsed in Mariana, a small town located in the southeast region of Brazil, spreading mining waste and mud, affecting the environment and entire cities on its way. This research focuses on Samarco, its suppliers and partners, to understand how the companies reacted after the disaster.

065-1647 A Behavioral Theory of SSCM Decision Making in Non-Exemplar Firms
Jon Kirchoff, Assistant Professor, East Carolina University, United States

Standard economic theory and empirical evidence dictate that rational decision-makers will implement sustainable supply chain management (SSCM) practices. However, inductive research findings counter these assumptions: firms without exemplary SSCM practices face immense hurdles in developing a business case for sustainability initiatives. The Behavioral Theory of the Firm explains the findings.

065-0484 Scheduling Procurement Auctions
Janne Kettunen, Assistant Professor, George Washington University, United States
Young Kwak, Associate Professor, George Washington University, United States

We show that the schedule according to which procurements are auctioned can significantly impact procurements' costs when the market for procurement auctions is oligopolistic and bidders have limited resources. Using the Florida Department of Transportation procurement auction data, we show that the optimal schedule provides annually $15 million cost savings.

065-1242 Occupation Analysis of Multimodal Logistics Platforms
Ricardo Machado, Senior Lecturer, Pontifical Catholic University of Goias, Brazil
Tercio Garcia, CEO, Pontifical Catholic University of Goias, Brazil

We present a settlement proposal for a multimodal logistics platform considering economic and geographical aspects of some production chains. Each production chain was evaluated considering its added tax value in relation to the GDP ratio of the region, its business peculiarities, and its area of influence.

065-1347 High-Resolution Urban Freight Model
Sergio Caballero, Lecturer, Massachusetts Institute of Technology, United States
Eva Ponce-Cueto, Associate Professor, Research Associate, U.S. Minor Outlying Islands

We propose a high-resolution model of urban-freight that balances theoretical and data-driven analysis. We estimate urban-freight intensity based on primary data and the number of required delivery bays to support current and future freight intensity, and propose optimal locations. This model was applied to Massachusetts Avenue in Cambridge, MA.

065-1113 High-Resolution Logistics Data Analysis for Efficient and Sustainable Urban Last-Mile Delivery
Matthias Winkelbach, Lecturer, Center for Transportation & Logistics, United States
Daniel Merchan, Student, Center for Transportation & Logistics, United States
## Energy Efficiency Contracting in Supply Chains Under Asymmetric Bargaining Power

**Ali Shantia, Student, Hec Paris, France**  
Sam Afkali, Assistant Professor, Hec Paris, France  
Andrea Masini, Associate Professor, Hec Paris, France

This study analyzes effects of relative bargaining power and technology uncertainty on a supplier's decision to invest in energy efficiency (EE) measures. We analyze price-commitment and shared-investment contracts and compare how these mechanisms boost EE investment when buyers' high bargaining power and high technology uncertainty prevent suppliers from investing in EE.

## Closing a Supplier's Energy Efficiency Gap: The Role of Assessment Assistance and Procurement Commitment

**Jason Quang Nguyen, Student, University of Minnesota, United States**  
Karen Donohue, Associate Professor, University of Minnesota, United States  
Mili Mehta, Assistant Professor, University of Minnesota, United States

This paper analyzes the Energy Efficiency (EE) investment decisions of a capital-constrained manufacturer that competes with an alternate supplier for the business of a large industrial buyer. Through a series of game theoretic models, we analyze the impact of EE assessment assistance and procurement commitment on the supplier's EE investment.

## Energy Efficiency and Demand Response on a Production Line

**Eric Webb, Student, Indiana University Bloomington, United States**  
Kyle Cattani, Associate Professor, Indiana University, United States  
Owen Wu, Associate Professor, Indiana University Bloomington, United States

Energy efficiency and demand response are two options for demand-side management among industrial production firms. We show that increased participation in demand response decreases the optimal level of energy efficiency improvement. Considering demand response, we suggest policies to close the gap between firm-optimal and societal-optimal energy efficiency.

## Learning from Precursors to Disasters: The Role of Incentives

**Heikki Peura, Student, London Business School, United Kingdom**  
Nitin Bakshi, Assistant Professor, London Business School, United Kingdom

Disasters are invariably preceded by more frequent precursor events. To learn from precursors, a firm relies on an operator's reports; yet the operator is often also responsible for mitigating the occurrence of these incidents. We examine the role of incentives in mediating the resulting tradeoff between learning, mitigation and reporting.

## Trade Credit Insurance: Cancelable or Non-Cancelable?

**Nitin Bakshi, Assistant Professor, London Business School, United Kingdom**  
Christopher Chen, Student, London Business School, United Kingdom  
S. Alex Yang, Assistant Professor, London Business School, United Kingdom

We investigate the reasons for the coexistence of cancelable and non-cancelable forms of trade credit insurance that is offered to a supplier who sells goods to and offers trade credit to a buyer. We also aim to understand how these products influence operational decisions, and thus, drive supply chain efficiency.

## Recovering from Disruptions: The Role of Sourcing Strategy

**Karan Girotra, Assistant Professor, INSEAD, France**  
Serguei Netessine, Professor, INSEAD, Singapore  
Nitin Jain, Assistant Professor, London Business School, United Kingdom

Fast recovery from supply chain disruptions is a key objective of supply chain and business continuity professionals. Using global sourcing data from more than two million import manifests, we construct an estimator of supply chain recovery rate and study its link to various sourcing strategies.

## Manufacturing Sourcing in a Global Supply Chain: A Life Cycle Analysis

**Morris Cohen, Professor, University of Pennsylvania, United States**  
Shiliang Cui, Assistant Professor, Georgetown University, United States

Motivated by a benchmark study, we propose a comprehensive model framework for the global sourcing location decision process that incorporates a full life cycle perspective, i.e., product design, manufacturing and fulfillment, and after-sale service support.

## Designing Contracts for Shared Value: Endogenous Process Yield in Direct Sourcing

**Joann de Zegher, Student, Stanford University, United States**
<table>
<thead>
<tr>
<th>Session: Improving System Performance</th>
<th>Track: General/Emerging Topics in Operations Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair(s): Neide Ossovski</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>065-0941 Operational Response to Climate Change: Do Profitable Carbon Abatement Opportunities Decrease Over Time?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Christian Blanco, PhD Candidate, University of California Los Angeles, United States</td>
</tr>
<tr>
<td>Charles Corbett, Professor, University of California Los Angeles, United States</td>
</tr>
<tr>
<td>Felipe Caro, Associate Professor, University of California Los Angeles, United States</td>
</tr>
</tbody>
</table>

We explore data collected by CDP (formerly the Carbon Disclosure Project) on over 11,000 projects implemented by 956 firms. We find that the average payback period is increasing by about one month for each reporting period, but less so for firms that pursue a higher fraction of process emissions reduction.

<table>
<thead>
<tr>
<th>065-1721 Towards Responsible Operations and Supply Chains: A Conceptual Typology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aleda Roth, Professor, Clemson University, United States</td>
</tr>
</tbody>
</table>

We present a conceptual typology of socially responsible operations and supply chain business models. By example, some of these are characterized as disruptive innovators, which are contrasted to other strategic groups. Challenges and opportunities for improving human well-being, sustainability and business success are discussed and a research agenda is given.

<table>
<thead>
<tr>
<th>065-1926 Lean and Six Sigma as Contrasting Systems of Organizational Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>David Hinds, Associate Professor, Nova Southeastern University, United States</td>
</tr>
</tbody>
</table>

In addressing the need for conceptual and operational definitions of process improvement, we develop a generalized framework based upon organizational change theory. Using this framework, we argue that Lean and Six Sigma represent two distinct systems of organizational change. Key features of the two systems are described and compared.

<table>
<thead>
<tr>
<th>065-0696 Collection Score and Opportunities for the Non-Performing Loans Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maria Gouvea, Associate Professor, Universidade de São Paulo, Brazil</td>
</tr>
</tbody>
</table>

We develop a collection score model using a sample of 254,914 clients of a Brazilian company with a portfolio of non-performing loan portfolio, and utilize Logistic Regression to identify clients who have greater propensity to pay non-performing-loans. We present suggestions for business applications of this model.

<table>
<thead>
<tr>
<th>065-1649 A Comprehensive Analytic Framework of Strategic Trade-Offs in Operations Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zongjian Chen, Associate Professor, Huazhong University of Science &amp; Technology, China</td>
</tr>
</tbody>
</table>

We analyzed the mechanism of the law of trade-offs using a holographic paradigm. Utilizing thought experiments, we establish important tradeoffs and performance fronts.

<table>
<thead>
<tr>
<th>065-0791 Performance Measurement System - A Conceptual Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neide Ossovski, Student, Pontifical Catholic University of Parana, Brazil</td>
</tr>
<tr>
<td>Sergio Gouvea da Costa, Professor, Pontifical Catholic University of Parana, Brazil</td>
</tr>
<tr>
<td>Edson Pinheiro de Lima, Associate Professor, Pontifical Catholic University of Parana, Brazil</td>
</tr>
</tbody>
</table>

In a globalized world, performance measurement has become crucial in order for enterprises to build best-in-class operations. We examine the main aspects of a performance measurement system (PMS), presenting a proposed conceptual model. Both our theoretical review and this conceptual model guide enterprises toward PMS implementation and improvement.

<table>
<thead>
<tr>
<th>065-0623 Dynamic Pricing and Inventory Management Under Network Externalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nan Yang, Assistant Professor, Washington University St Louis, United States</td>
</tr>
<tr>
<td>Renyu Zhang, Student, Washington University St Louis, United States</td>
</tr>
</tbody>
</table>

We study a joint pricing and inventory management model with network externalities. Customers' willingness-to-pay and, thus, the potential demand of the product are increasing in network size. We characterize the optimal policy and analyze the impact of network externalities upon the firm's pricing and inventory decisions.

<table>
<thead>
<tr>
<th>065-0209 Effect of a Price-Driven Secondary Market on a System with Random Demand and Uncertain Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refik Gullu, Professor, Bogazici University, Turkey</td>
</tr>
<tr>
<td>Yucel Gurel, Student, Bogazici University, Turkey</td>
</tr>
</tbody>
</table>

We consider purchasing and pricing decisions for a commodity whose demand and material cost are random. We analyze a model with two sales cycles, through primary and secondary markets. We determine the optimal purchase quantity and optimal sales price to be used at the beginning of the secondary sales cycle.

<table>
<thead>
<tr>
<th>065-1051 Measuring the Bullwhip Effect: Discrepancy and Alignment Between Information and Material Flows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wei Luo, 1 E S E, Spain</td>
</tr>
<tr>
<td>Kevin Shang, Associate Professor, Duke University Durham, United States</td>
</tr>
<tr>
<td>Li Chen, Associate Professor, Duke University Durham, United States</td>
</tr>
</tbody>
</table>

We study the potential of two instruments - contracts and sourcing channels - to create mutual benefit in decentralized agricultural value chains. We show that value chain innovations need to be properly designed, and sometimes combined, to lead to sustainable implementation.
We focus on understanding the bullwhip measurement and providing methods to infer demand variance from available material flow data. We derive conditions under which estimation discrepancy occurs and characterize the driving factors. We also propose a discrepancy reduction method to improve the estimation of bullwhip effect.

143  
Friday, 03:15 PM - 04:45 PM, Salon 4-5 
Session: POMS Applied Research Challenge: Final Presentations 
Chair(s): Felipe Caro 

Track: Panels, Tutorials, Meetings 

065-2084  From Predictive to Prescriptive Analytics 
Dimitris Bertsimas, Professor, Massachusetts Institute of Technology, United States 
Nathan Kallus, Assistant Professor, Cornell University, United States 

We develop new frameworks and solutions for data-driven optimization given an observation of auxiliary covariates. We prove generality, tractability, and asymptotic optimality. Managing inventory for a distributor with 1-billion-unit annual throughput, our method achieves 88% improvement measured in our new "coefficient of prescriptiveness" by leveraging large-scale internal and web-search-trend data.

065-2085  Optimal Purification Decisions for Engineer-to-Order Proteins at Aldevron 
Tugce Martagan, Assistant Professor, Eindhoven University of Technology, Netherlands 
Ananth Krishnamurthy, Associate Professor, University of Wisconsin Madison, United States 
Peter Leland, . . 
Christos Maravelias, . . 

We analyze protein purification operations in the pharmaceutical industry. We develop a Markov decision model, and partition the state space into distinct decision zones. These zones provide a comprehensive assessment of the purification capabilities and business risks. Implementation at Aldevron indicates an average 20% reduction in lead times and costs.

065-2086  Quantifying Uncertainties Using Expert Assessments in a Dynamic New Product Development Environment 
Saurabh Bansal, Assistant Professor, Penn State University University Park, United States 
Genaro Gutierrez, Associate Professor, McCombs School of Business, United States 
John Keiser, . . 

We discuss a novel approach for estimating operational uncertainties using a domain expert’s judgments for probability distributions, in the absence of data. The approach has been implemented at Fortune 100 agribusiness firm for making a large-scale annual capital investment decision with significant benefits.
<table>
<thead>
<tr>
<th>Session: Humanitarian and Health Operations Management</th>
<th>Track: Humanitarian Operations and Crisis Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair(s): Gralla Erica</td>
<td></td>
</tr>
</tbody>
</table>

### 065-0523 A Logistics Service Network Design for Humanitarian Response in East Africa

Emilie Dufour, Student, Hec Montreal, Canada  
Marie-Eve Rancourt, Assistant Professor, Universite Du Quebec A Montreal, Canada  
Gilbert Laporte, Professor, Hec Montreal, Canada  
Julie Paquette, Assistant Professor, Hec Montreal, Canada

We analyze the benefits of adding a regional distribution center to the existing depot network of the UNHRD in East Africa. To this end, we use simulation, network optimization, and statistical analysis to assess the costs of prepositioning high-demand non-food items in Kampala and to propose a robust solution.

### 065-1908 Optimized Oral Cholera Vaccine Distribution Strategies to Minimize Disease Incidence

Hannah Smalley, Reader, Georgia Institute of Technology, United States  
Pinar Keskinocek, Professor, Georgia Institute of Technology, United States  
Julie Swann, Associate Professor, Georgia Institute of Technology, United States  
Alan Hinman, Senior Public Health Scientist, Task Force for Global Health, United States

There is currently no systematic method for determining the best allocation of oral cholera vaccines to minimize disease incidence in a population where the disease is endemic and resources are limited. We present a mathematical model for optimally allocating vaccines in a region under varying levels of demographic and incidence data availability. The model addresses the questions of where, when, and how many doses of vaccines.

### 065-1287 Organizational Culture and Supply Chain Collaboration: A Humanitarian Context

Sabari Prasanna, Student, Humlog Institute, Hanken School of Economics, Finland  
Ira Haavisto, Lecturer, Humlog Institute, Hanken School of Economics, Finland  
Gyöngyi Kovács, Professor, Humlog Institute, Hanken School of Economics, Finland

We attempt to unravel the relationship between the organizational culture of humanitarian aid suppliers and the depth of collaboration that they have with their customers. Template analysis on interviews with suppliers shows the relationship between organizational culture and supply chain collaboration. The results show important trends and propositions.

### 065-1322 Competition for Funding in Humanitarian Operations

Alfonso Pedraza-Martinez, Assistant Professor, Indiana University, United States  
Arian Aflaki, Student, Duke University Durham, United States

Donors seek control over their donations, while this hurts the operational efficiency of Humanitarian Organizations (HOs). We study the trade-off between operational performance, fundraising effort, and donor preferences and we show that competition among HOs in the fundraising phase can lead to lower operational efficiency and higher fundraising cost.

### 065-0777 Disaster Response Test Cases: Representing Real Disasters

Azrah Azhar, Student, George Washington University, United States  
Erica Gralla, Assistant Professor, George Washington University, United States

In humanitarian literature, the performance of algorithms and policy recommendations depend on test cases used by researchers. We emphasize the importance of test cases that are representative of real disasters. We develop measures of critical disaster characteristics, analyze 27 real disasters, and compare the results to test cases from humanitarian literature.

### 065-0245 Robust Newsvendor Facing Mixed Demand

Daniel Chen, Student, Massachusetts Institute of Technology, United States  
Retsef Levi, Professor, Massachusetts Institute of Technology, United States  
Georgia Perakis, Professor, Massachusetts Institute of Technology, United States

When deciding optimal inventory levels, full knowledge of demand distribution is typically unavailable. We model partial information by letting demand be a mixture of known distributions with unknown weights and formulate a robust optimization problem. The resulting solution is tractable, and we show both theoretical bounds and good computational performance.

### 065-0333 Online and Offline Information for Omnichannel Retailing

Fei Gao, Student, University of Pennsylvania, United States  
Xuanming Su, Associate Professor, University of Pennsylvania, United States

Omnichannel consumers strategically make use of online and offline channels to gather information and purchase products. We study different omnichannel information strategies and their profit implications for firms.

### 065-1268 Collaborative Shipping under Information Asymmetry

Valeria Padilla Tinoco, Student, Katholieke Universiteit Leuven, Belgium  
Robert Boute, Associate Professor, Katholieke Universiteit Leuven, Belgium

We examine the incentives for a firm to distort its demand information under a two-company collaborative shipping collaboration. We find that this strongly depends on the allocation mechanism to share the joint costs, and study how this information distortion can be eliminated.

### 065-1307 Consumer Choice and Market Outcomes under Ambiguity in Product Quality

Onesun Yoo, Assistant Professor, University College London, United Kingdom  
Rakesh Sarin, Professor, University of California Los Angeles, United States
Facing purchase choices involving ambiguity in product quality, consumers are boundedly rational. Consumers also exhibit varying degrees of predisposition towards a product. We present a simple consumer choice model under ambiguity. Understanding the predisposition / ambiguity interaction may aid a firm’s information and brand management strategy.

### 147 065-1588

**Pharmaceutical Supply Chain Shortages Classification**

Kurtis Homan, Student, Purdue University, United States

The occurrences of drug shortages in the US have been increasing since 2006 with few researchers investigating the issue. This research uses a systematic approach on literature review and agency summits to classify the opportunities to address the shortage problem by linking the approaches to theoretical frameworks.

### 148 065-1484

**The Impact of Patient Handoffs in an Emergency Department**

Robert Batt, Assistant Professor, University of Wisconsin Madison, United States

We look at the effect of emergency department patient hand-offs on operational variables such as length of stay, revisit rate, and patient satisfaction. We also examine what factors impact the probability of a patient being handed off at the end of a shift versus being dispositioned by the current doctor.

### 149 065-1544

**A Model of Care Transition From a Resource-Intensive Setting to Home**

Olga Bountali, Student, Southern Methodist University, United States

Treatments that require recurring inpatient hospitalization put severe constraints on hospital resources, particularly if treatment costs cannot be recovered. One option is to transfer treatment care to a setting that alleviates these constraints but potentially increases the risk to patient health. We propose a stylized model to analyze this tradeoff.
Telemedicine has been proven to increase access to patients and reduce travel burden. In the context of an ongoing pilot study of telemedicine for individuals with migraines, we investigate how telemedicine could add economic value to specialists and their clinical practices by reducing no-shows and increasing productivity.

**149**

**Friday, 05:00 PM - 06:30 PM, Salon 7**

**Track:** Healthcare Operations Management

**Chair(s):** Sriram Venkataraman

**065-0089** Impact of the Meaningful Use of Technology on Patient Outcomes

Deepa Wani, Student, University of South Carolina, United States
Manoj Malhotra, Professor, University of South Carolina, United States

Electronic Health Records (EHRs) have the potential to transform healthcare delivery through the use of built-in, evidence-based medical guidelines and efficient coordination of patient treatment and care. In this study, we examine the impact of the meaningful use of EHRs on patient outcomes in the context of task complexity.

**065-0144** Reverse Robin Hood Syndrome? Hospital Behaviors Resulting From Healthcare Financial Incentive Policy

Seung Jun Lee, Student, Texas A&M University College Station, United States
Gregory Heim, Associate Professor, Texas A&M University College Station, United States
Aleda Roth, Professor, Clemson University, United States
Sriram Venkataraman, Assistant Professor, University of South Carolina, United States

We examine whether hospitals respond to government incentive policies by improving process or outcome qualities, or by gaming their operational responses. Using different observational data sets from CMS and other healthcare sources, we provide empirical evidence of the effect of financial penalties on hospital responses.

**065-0160** Healthcare Quality and Network Affiliation

Anand Nair, Professor, Michigan State University, United States
Mariana Nicolae, Assistant Professor, Eastern Michigan University, United States
David Dreyfus, Student, Michigan State University, United States

In this empirical study, we examine how the quality characteristics of hospitals distinctively influence the association of the size of a healthcare network, experiential learning, and their interaction with operating cost.

**065-0592** The Impact of the Electronic Medical Record (EMR) Adoption Process on Patient Experience and Cost

Luv Sharma, Student, Ohio State University, United States
Aravind Chandrasekaran, Associate Professor, Ohio State University, United States

We look at the adoption process for Health Information Technologies (HIT) at 979 hospitals to identify an ideal implementation strategy. We define the process of adoption in terms of the sequence and intensity of adoption of HITs. The results demonstrate an ideal sequence whose benefits depend on intensity of adoption.

**150**

**Friday, 05:00 PM - 06:30 PM, Salon 8**

**Track:** Healthcare Operations Management

**Chair(s):** Wiljeana Glover

**065-0248** Contracts to Promote Quality Provision in Breast Cancer Treatment

Salar Ghamat, Student, Richard Ivey Business School, Canada
Greg Zoric, Professor, University of Western Ontario, Canada
Hubert Pun, Assistant Professor, University of Western Ontario, Canada

We design outcome-oriented payment contracts to align incentives of a healthcare purchaser and physician to reach socially-optimal levels of use for a diagnostic test. We find that when treatment becomes less effective or its adverse effects become more significant, there are cases where all patients are treated without being tested.

**065-1974** Impact of Integrated Communication Systems on Primacy Care Efficiency: A Quasi-Experimental Study

Thomas Hardy, Student, University of Colorado Denver, United States
Francisco Dominici, Chief Information Officer, Colorado Springs Military Health System, United States

Hospitals and clinics are using integrated communication systems (ICS) to improve communication workflow and coordination. We address the research gap on how ICS impacts the operational efficiency of outpatient primary care clinics. Preliminary empirical evidence shows positive, significant effects of ICS. Our study will inform managers of health systems and DoD.

**065-1312** Integrative Practices for Improved Quality of Care: A Human Systems Integration Approach

Wiljeana Glover, Assistant Professor, Babson College, United States
Eitan Naveh, Associate Professor, Technion Israel Institute of Technology, Israel

Many healthcare reforms are integrative practices (e.g., contracts, care coordination, and information technology systems); yet integrative practices have rarely yielded improved performance. Our study of 34 hospital departments uses human systems integration to examine the technical and human factors as conditions under which integrative practices may influence quality of care.

**151**

**Friday, 05:00 PM - 06:30 PM, Crystal**

**Track:** Humanitarian Operations and Crisis Management

**Chair(s):** Johanna Amaya

**065-1633** A Stochastic Model for Donation Collections Following a Disaster Event

Emmett Lodree, Associate Professor, University of Alabama Tuscaloosa, United States
Robert Cook, Student, University of Alabama Tuscaloosa, United States
This study introduces a Markov decision process (MDP) model for collecting donations and distributing them to disaster survivors. Donations that accumulate over time at collection sites are periodically transported to a relief center where they are distributed to beneficiaries. The MDP model minimizes expected unsatisfied demand during a finite horizon.

065-0986 Modeling Temporary, Interim, and Permanent Housing Recovery

Rafael Diaz, José MIT-Zaragoza, Spain
Joshua Behr, Old Dominion University, United States
David Earnest, Associate Professor, Old Dominion University, United States

We present a Supply Chain Management perspective in modeling a housing recovery process after the occurrence of a catastrophic event. We present a discrete-event simulation model that illustrates the short- and long-term housing production dynamics as well as population impacts associated with adopting various local pre-disaster planning strategies.

065-0698 Districting in Post-Disaster Humanitarian Logistics

José Araya, Student, Rensselaer Polytechnic Institute, United States
Jose Holguín-Veras, Professor, Rensselaer Polytechnic Institute, United States

We describe a methodology to solve the problem of districting a disaster area among relief groups in post-disaster situations. Building upon formulations that minimize the social costs of the operation, a districting strategy is proposed to expedite the flow of critical supplies to demand points.

152 Friday, 05:00 PM - 06:30 PM, Lanai

Session: Recent Trends in Retail Operations

Chair(s): Mehmet Altug

065-0904 Holiday Retail Operations, Gift Cards, and Unclaimed Property Laws

Xiangwei Lu, University of Pennsylvania, United States
Xuanming Su, University of Pennsylvania, United States

As retailers have offered more lenient return policies, customer abuse and fraudulent returns have risen. To combat increased returns, retailers have begun to identify "bad" customers instead of universally changing return policies. In a two-period framework, we study the impact of selectively changing return policies on retailer's profit.

065-0753 Effects of Assortment Size Announcements on Manufacturer Competition

H. Sebastian Heese, Professor, Ebs Business School, Germany
Víctor Martínez-de-Albéniz, Associate Professor, I E S E, Spain

We study the impact of retailer assortment strategies on manufacturer wholesale pricing. The size of an assortment affects both competition between manufacturers for inclusion in the assortment and competition between participating manufacturers for market share. We optimize retailer assortment strategies taking into account these two effects.

153 Friday, 05:00 PM - 06:30 PM, Veranda

Session: Product Return in Retail Operations

Chair(s): Guangzhi Shang

065-0110 Return Abuse, Countermeasures, and Privacy Concerns

Serkan M. Akturk, Student, Texas A&M University College Station, United States
Michael Ketzenberg, Associate Professor, Texas A&M University College Station, United States

We investigate return abuse, fraudulent and opportunistic consumer returns, and potential countermeasures to fight them. We also show how those countermeasures impact a retailer's profitability, demand structure, and policy parameters with respect to price and refund. To some extent, our findings contradict suggestions in the literature.

065-0112 Optimal Pricing and Return Policies for Loss-Averse Customers

Wenjing Shen, Associate Professor, Drexel University, United States

Customer return policies reduce product misfit uncertainty and improve customer satisfaction. Previous studies on customer return have assumed loss neutral customers. We study the impact of customer loss aversion on the optimal price, inventory, and return policies.

065-0713 To Remarket Now or Save for Warranty Claims

Cerag Pince, Assistant Professor, Kuehne Logistics University, Germany
Mark Ferguson, Professor, University of South Carolina, United States
Bertil Toktay, Professor, Georgia Institute of Technology, United States

Consumer returns constitute a substantial fraction of sales in the consumer electronics industry and often cannot be resold as new due to litigation concerns. We investigate how an OEM should price new and refurbished products while allocating consumer returns between remarketing and warranty coverage options over the product's lifecycle.

065-1021 The Analytics of Product Return Episodes in Retailing

Aydin Alptekinoglu, Penn State University University Park, United States
Paul Messinger, Associate Professor, University of Alberta, Canada
Michele Samorani, Assistant Professor, University of Alberta, Canada
A product return episode is a sequence of transactions composed of a purchase, a return, a repurchase of a similar product, etc., and concluding with a final purchase or return. We empirically investigate the characteristics of return episodes using a data set from a large consumer electronics retailer.

We provide an overview of the research problems on currency supply chains. The structure of a general banknote supply chain is given before the discussion of the problems from three different aspects: the supply side, the demand side, and the third party logistics providers.

We treat the U.S. coin supply chain as a closed-loop supply chain and present a framework to analyze it from both supply and demand side perspectives in the context of minimizing the total cost of producing coins, and supplying and managing coin inventory.

We explore applicable scheduling problems under conditions of patient heterogeneity in service times and patient no-shows. Grounded in practices and successful manufacturing processes (i.e., Heijunka), we introduce a new scheduling method. We also adapt the approach to the overbooking policy and open-access policy.

We study movement of material at an international cross-docking terminal of a U.S.-based company. The materials arrive to the cross-dock facility from international suppliers. Finding the optimal material flow at the cross dock is essential to maximize the efficiency of the logistics operations.

The new trends of entrepreneurship are creating globalized business that requires of application high performance manufacturing practices to compete in global markets. The adaptability of these practices in new business allows performance improvement, lower cost and grows up research, innovation and develops capital.

We model how a judge schedules cases as a multi-armed bandit problem. We use the model to derive a more efficient case scheduling heuristic. We test our heuristic with a field experiment in the Roman Labor Court of Appeals. Our intervention decreased case flow times by 19%.

We provide an overview of the research problems on currency supply chains. The structure of a general banknote supply chain is given before the discussion of the problems from three different aspects: the supply side, the demand side, and the third party logistics providers.

We treat the U.S. coin supply chain as a closed-loop supply chain and present a framework to analyze it from both supply and demand side perspectives in the context of minimizing the total cost of producing coins, and supplying and managing coin inventory.

We explore applicable scheduling problems under conditions of patient heterogeneity in service times and patient no-shows. Grounded in practices and successful manufacturing processes (i.e., Heijunka), we introduce a new scheduling method. We also adapt the approach to the overbooking policy and open-access policy.

We study movement of material at an international cross-docking terminal of a U.S.-based company. The materials arrive to the cross-dock facility from international suppliers. Finding the optimal material flow at the cross dock is essential to maximize the efficiency of the logistics operations.
We study caller redial behaviors using call center data from a US-based bank. We show which factors affect the probability of redialing and the time between queue abandonment and redial. Using structural estimation, we show through counterfactual experiments how a center with callers who redial performs under various routing policies.

**065-0820 New Product Pricing and Capacity Allocation for Age-Based Products**
Christopher Tang, Professor, University of California Los Angeles, United States
Hossein Jahandideh, Student, University of California Los Angeles, United States

For age-based products such as whiskey, introducing a new age group means introducing a whole new product with demand uncertainty and substitution effects with existing products. We examine the question of what fraction of capacity to allocate to the new product and how to price the new product over time.

**065-1081 Wine Analytics: Fine Wine Pricing and Selection under Weather and Market Uncertainty**
Mert Hakan Hekimoglu, Student, Syracuse University, United States
Burak Kazaz, Associate Professor, Syracuse University, United States
Scott Webster, Professor, Arizona State University Tempe, United States

We examine a distributor’s selection between bottled wine and wine futures. We conduct an empirical analysis using Liv-ex.com data that explains how futures prices evolve to bottle price. We then examine an analytical model to determine the optimal selection of bottled wine and wine futures using a value-at-risk measure.

---

**157 Friday, 05:00 PM - 06:30 PM, Gardenia**
**Session:** Fleet management, carrier selection and delivery scheduling
**Track:** Scheduling and Logistics
**Chair(s):** Emrah Demir

**065-1939 Computational Model for Fleet Management Based on Reliability Centered Maintenance**
Marcelo Okano, Professor, CEETEPS, Brazil
Oduvaldo Vendrameotto, Professor, Universidade Paulista - Unip, Brazil
Osmildo Santos, Professor, Universidade Potiguar, Brazil
Marcelo Fernandes, Professor, Centro Estadual de Educaacao Tecnologica Paula Souza, Brazil
Marcelo Fernandes, Professor, Universidade Nove de Julho, Brazil

We study the computational mapping for evaluation of failure indicators in the transportation segment. Our proposal establishes the relationship between the computational tools and the necessity to get reliable information. The results show a significant time reduction and a strong impact on the reduction of failure.

**065-0388 Rendezvous Transport Problem with Attachable Trucks**
Li Sun, Lecturer, Business School of Hohai University, China
Huimin Wang, Professor, Business School of Hohai University, China
Jing Hou, Lecturer, Business School of Hohai University, China

Trucks with attachable trailers are introduced to utilize Rendezvous Routing in a postal distribution network. A mathematical programming model is introduced which integrates three problems: locating meeting depots, allocating shipments to these meeting depots, and scheduling these shipments. Additionally, a heuristic algorithm based on Tabu Search procedure is developed.

**065-1080 Transportation Service Procurement Considering Carriers’ Service Schedules**
Xiang Ji, Student, University of Science & Technology of China, China
Jiasen Sun, Associate Professor, Soochow University, China

When practically selecting carriers to transport freight, shippers take into consideration not only freight rates, but also factors relevant to carriers’ service schedules. Since little academic work to date has considered such factors, there is a serious gap between practice and research regarding carriers’ service schedules in transportation service procurement.

**065-0246 The Green Vehicle Allocation Problem**
Emrah Demir, Assistant Professor, Eindhoven University of Technology, Netherlands
Tom Van Woensel, Professor, Eindhoven University of Technology, Netherlands

The vehicle assignment to freight shipments is investigated to improve allocation decisions such that both operational costs and emissions can be reduced. Our approach addresses dynamic fleet management and helps planners select the most economical fleet schedule with the lowest environmental impact.

---

**158 Friday, 05:00 PM - 06:30 PM, Hibiscus**
**Session:** Circular Flows in Closed Loop Supply Chains Environmental Considerations
**Track:** Closed-Loop Supply Chains
**Chair(s):** Aybek Korugan

**065-0702 Sustainable Supply Chain Management in Fuzzy Environment: A Literature Survey**
Ozden Tozanni, Student, University of Bridgeport, United States
Gazi Duman, Student, University of Bridgeport, United States
Elif Kongar, Associate Professor, University of Bridgeport, United States

Sustainable supply chain management is an emerging research area due to its significant social, environmental and economic impact. With this motivation, we provide a content analysis on sustainable supply chain management with a focus on fuzzy sets and theory and its applications.

**065-0827 Managing Environmental Issues in a Reverse Supply Chain**
Bandar Alkhayyal, Student, Northeastern University, United States
Matthew Eckelman, Assistant Professor, Northeastern University, United States
Surendra Gupta, Professor, Northeastern University, United States

We use a multi-criteria decision-making problem in a reverse supply chain network with environmental concerns that captures the trade-off between profit and ecology goals. We determine the optimal flow of parts to maximize the total profit and minimize the CO2 emission, energy, transportation, rent, labor, and product recovery costs.
065-0989 On the Optimality of Production Flow in Hybrid Remanufacturing / Manufacturing Systems
Aybek Korugan, , Bogazici University, Turkey
Murat Fadiloglu, Professor, Yasar University, Turkey

CLSC structures consider remanufactured goods as a secondary revenue resource. Yet frequently the profitability of remanufactured goods is higher than the primary product. Hence, production decisions have to incorporate the strong correlation between primary and secondary goods. Our aim is to investigate the optimal decision characteristics for this problem.

065-0374 Optimal Product Quality Strategy with Consumer Heterogeneity on Platform Quality
Yong Zha, Lecturer, University of Science & Technology, China
Lu Zhang, Student, University of Science & Technology, China
Xiuli He, Associate Professor, University of North Carolina Charlotte, United States
Subodha Kumar, Professor, Texas A&M University College Station, United States

We study the firm’s quality strategy of a technology product associated with a platform. Consumers are homogeneous or heterogeneous on the platform quality. We consider the firm’s different platform cost structures. We show that the platform quality may have a non-monotonic impact on the firm’s optimal quality decision.

065-1333 Optimizing Incentives for Carbon Capture and Storage Systems
Wenbo Cai, , New Jersey Inst of Technology, United States
Dashi Singham, , Naval Postgraduate School, United States

We investigate the effectiveness of incentives on the participation in Carbon Capture and Storage (CCS) among carbon emitters, CCS storage operators, and a regulator. We use a mechanism design approach to derive the optimal incentives and capacity allocation among emitters while considering demand uncertainty, emitters’ multidimensional heterogeneity, and capacity constraints.

065-1618 Product Upgrades with Stochastic Technology, Product Failure, and Brand Commitment
Sam Kirshner, Lecturer, University of New South Wales, Australia
Yuri Levin, , Queens University, Canada
Mikhail Nediak, , Queens University, Canada

Firms upgrade their products to capture incremental demand generated by stochastic improvements in technology. We analyze the impact of branding and temporary price reductions on firm upgrade strategies. We characterize the optimality policy when firms face the potential to release products that fail to meet consumer expectation.

065-0012 Hidden Profiles in Corporate Prediction Markets: The Impact of Public Information Precision
Liangfei Qiu, Assistant Professor, University of Florida, United States
Jingchuan Pu, Student, University of Florida, United States

Recently, large companies are experimenting with corporate prediction markets run among their employees. In the present study, we develop an analytical model to analyze the effects of information precision and social interactions on prediction market performance, and find that public information is not always beneficial to prediction market performance.

065-0607 Economic Analysis of Mobile Service Contracts
Xuying Zhao, Associate Professor, University of Notre Dame, United States
Hong Guo, Assistant Professor, University of Notre Dame, United States
Gangshu Cai, Associate Professor, Santa Clara University, United States
Subhajyoti Bandypadhyay, Associate Professor, University of Florida, United States

It is commonly observed in practice that mobile carriers usually offer two-year contracts to consumers. However, recently, major mobile carriers are eliminating contracts. We investigate the impacts of contract-elimination on device manufacturers, carriers, consumers, and society as a whole.

065-1120 Mechanism Design of Centralized Product Delivery for Online Trading Platforms
Xiang Ji, Student, University of Science & Technology of China, China
Jiasen Sun, Associate Professor, Soochow University, China
Yaoyu Wang, ,
Lei Li, Assistant Professor, University of Electronic Science & Technology of China, United States

Most products sold through online trading platforms are delivered to consumers by different seller-chosen expressers. This is not the optimal product delivery mode. We designed a centralized product delivery mechanism, which we show to have positive impacts on platform’s revenue, buyers’ payoffs, sellers’ payoffs, and social welfare.

065-1714 The Negotiation between Software Vendor and Client on Software Release Schedule: A Nash Bargaining Approach
Yasin Ceran, Assistant Professor, Santa Clara University, United States
Dengpan Liu, Associate Professor, Iowa State University, United States
Mitali Dawande, Professor, University of Texas Dallas, United States
Vijay Mookerjee, Professor, University of Texas Dallas, United States

We address the conflicts between a software vendor and a client in the incremental software development regime wherein the client begins utilizing parts of the system released to them even before the entire system is completed. Using a Nash bargaining approach, we obtain Pareto-optimal outcomes for the two parties.
<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Innovation, Learning and Technology Management</th>
<th>Chair(s): Nachiappan Subramanian</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-1114</td>
<td>Knowledge Management and Networks Supply Chain. Benefits of Virtual Learning Environments</td>
<td>Homayoun Khamooshi, Associate Professor, George Washington University, United States</td>
</tr>
<tr>
<td>Neusa andrade, Student, Unip/ Embrapa, Brazil</td>
<td>Esdras Barboza, Student, Universidade Paulista - Unip, Brazil</td>
<td></td>
</tr>
<tr>
<td>Oduvaldo Vendrametto, Professor, Universidade Paulista - Unip, Brazil</td>
<td>Marcia Terra da Silva, Professor, Universidade Paulista - Unip, Brazil</td>
<td></td>
</tr>
<tr>
<td>Supply Chain Management (SCM) can benefit from Knowledge Management practices generating innovations that streamline the relationships in Supply Networks. We identify how certain models of Knowledge Management (KM) can be aided by Virtual Learning Environments and how this use allows the exchange of best practices in logistics.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>065-0011</td>
<td>Setting Contingency for Overall Risk of Multiple NPD Projects, a Binomial Perspective</td>
<td>Janne Kettunen</td>
</tr>
<tr>
<td>Homayoun Khamooshi, Associate Professor, George Washington University, United States</td>
<td></td>
<td></td>
</tr>
<tr>
<td>065-1019</td>
<td>Service Modularization Based on SDL: An Application in Catering</td>
<td>Yutian Li, Student, University of Miami, United States</td>
</tr>
<tr>
<td>Wang Mengsi, Student, Huazhong University of Science &amp; Technology, China</td>
<td>Zhou Shuyin, Associate Professor, Huazhong University of Science &amp; Technology, China</td>
<td></td>
</tr>
<tr>
<td>The article explores service modularity based on supply chain environment with a mathematical model in catering. Not only we regard downstream clients as the source of value creation, which SDL indicates the co-creation, but also combining activities and customers’ resources to achieve the goal of service value innovation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>065-1218</td>
<td>Out-In, In-Out Buyer Innovation Pathways to Enhance Competitiveness: Empirical Evidence from China</td>
<td>Muhammad Abdulrahman, Assistant Professor, Nottingham University Business School China, China</td>
</tr>
<tr>
<td>Nachiappan Subramanian, Associate Professor, Nottingham University, Ningbo China, China</td>
<td>Crystal QIAO, Sourcing Manager, Remue Menage Asia, China</td>
<td></td>
</tr>
<tr>
<td>We study buyers’ innovation potential using out-in (identification of innovative suppliers) and in-out (buyer’s knowledge transfer to suppliers) pathways. While supplier’s innovation ability and passion are common factors, cooperative attitude and cost reduction are the differentiating factor for out-in and in-out pathways respectively in the context of the Chinese consumer goods industry.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>065-0931</td>
<td>Models to Implement Learning Analytics: A Literature Review</td>
<td>Nan Yang, Assistant Professor, Washington University St Louis, United States</td>
</tr>
<tr>
<td>Eliangela Moraes, Student, Universidade Paulista - Unip, Brazil</td>
<td>Marcelo SOUZA, Professor, Universidade Paulista - Unip, Brazil</td>
<td></td>
</tr>
<tr>
<td>Marcela Terra da Silva, Professor, Universidade Paulista - Unip, Brazil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managing Distance Education courses produces a great amount of data organized in different isolated systems. Large and preexisting databases can be an obstacle to gathering useful information for decision making. Based on literature review, we present models to implement Learning Analytics and the main challenges the managers must overcome.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>065-0608</td>
<td>Supply Diversification Under Random Yield and Price Dependent Demand</td>
<td>Desheng Wu</td>
</tr>
<tr>
<td>Lingxiu Dong, Professor, Washington University St Louis, United States</td>
<td>Guang Xiao, Student, Washington University St Louis, United States</td>
<td></td>
</tr>
<tr>
<td>Nan Yang, Assistant Professor, Washington University St Louis, United States</td>
<td></td>
<td></td>
</tr>
<tr>
<td>We consider a price-setting manufacturer’s supply diversification decisions under supply random yield. We study two pricing schemes: responsive pricing and ex ante pricing. We characterize the sourcing decisions under each pricing scheme and compare them to study the impact of pricing timing on the manufacturer’s sourcing and supplier selection decisions.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>065-0951</td>
<td>Managing Supply Disruptions Under Asymmetric Information About Supply Reliability and Cost of Improvement</td>
<td>Muhammad Abdulrahman, Assistant Professor, University of Miami, United States</td>
</tr>
<tr>
<td>Yutian Li, Student, University of Miami, United States</td>
<td>Yu Tang, University of Miami, United States</td>
<td></td>
</tr>
<tr>
<td>We consider a manufacturer who sources from an unreliable supplier. The supplier can take costly effort to improve reliability, but has private information about either its initial reliability or improvement cost. We examine how these two types of asymmetric information affect manufacturer’s profit, information rent, and channel loss differently.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>065-1393</td>
<td>Quality Investment, Pricing, and Inspection Decisions in Decentralized Supply Chains</td>
<td>Marcia Terra da Silva, Professor, University of Miami, United States</td>
</tr>
<tr>
<td>Murat Erkoc, Associate Professor, University of Miami, United States</td>
<td>Haresh Gurnani, Professor, Wake Forest University, United States</td>
<td></td>
</tr>
<tr>
<td>Sai bal Ray, Professor, McGill University, Canada</td>
<td>Mingz hou Jin, Professor, University of Tennessee Knoxville, United States</td>
<td></td>
</tr>
<tr>
<td>We study the impact of quality and inspection in bilateral monopoly supply chains. We show that an increase in quality does not always result in higher prices, and it is possible for the competitive setting to yield higher end-item quality compared to the integrated channel over a certain quality cost.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>065-0011</td>
<td>Setting Contingency for Overall Risk of Multiple NPD Projects, a Binomial Perspective</td>
<td>Janne Kettunen</td>
</tr>
<tr>
<td>Homayoun Khamooshi, Associate Professor, George Washington University, United States</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The R&D type of organizations, normally do not work on a single project but multiple projects or a portfolio of projects concurrently. These projects are expected to carry multiple risks with not so high probability of success. To manage the risks associated with these projects one can use a number of methods incorporating qualitative and quantitative modelling such as simulation modelling, risk tree and other analytical methods. The outcome of the analysis is to prepare for the potential risks by figuring out the needed contingency and setting aside resources as part of the project budget for a given level of confidence. In this research, a model for determining the needed contingency at the portfolio level is developed using binomial distribution, probability of the risk, and the level of impact. The optimum level of contingency is found when all the risks are pooled at the portfolio level rather than at the project level.

065-0230  To Better Manage Risks in New Product Development Portfolio Selection - Be Risk Neutral
Janne Kettunen, Assistant Professor, George Washington University, United States
Shivraj Kanungo, Associate Professor, George Washington University, United States

We investigate trade-offs among risk and return in the multi-period new product development (NPD) portfolio selection problems. Our analytical and numerical results show that it is optimal for NPD organizations to employ a risk neutral NPD project portfolio selection approach even if the decision makers are extremely risk averse.

065-0068  Value of Dynamic Pricing in Congestible Systems
Jeunghyun Kim, Student, University of Southern California, United States
Ramandeep Randhawa, Associate Professor, University of Southern California, United States

Dynamically changing the premium for access to limited resources based on congestion is prevalent. Our research question is: what is the value of dynamic pricing over static pricing. We prove that the value can be significant and a scheme of using only two price points reaps most of this value.

065-1042  Approximations for Queueing Dynamics in Inpatient Wards
Jing Dong, Assistant Professor, Northwestern University, United States
Ohad Perry, Assistant Professor, Northwestern University, United States

We consider queueing dynamics of bed-occupancy processes in inpatient wards. These are time varying, and having departures highly concentrated within a short time period. We characterize a necessary and sufficient condition for the system to be stable and employ a fluid approximation to characterize an asymptotic periodic behavior.

065-0010  Staffing a Service System Where Capacity Is Random
Rouba Ibrahim, Assistant Professor, University College London, United Kingdom

We study the problem of staffing many-server queues with a random number of servers. Such queues arise in business applications with self-scheduling agents, such as in virtual call centers or ride-sharing services. We rely on a fluid approximation, prove its asymptotic accuracy, and characterize the optimal staffing policy.

065-0404  Transparency and Complexity in Multi-Dimensional Sealed-Bid Procurement Auctions
Bernardo Quiroga, Assistant Professor, Clemson University, United States
Brent Moritz, Assistant Professor, Penn State University University Park, United States
V.D.R. Guide, Professor, Penn State University University Park, United States

We study two sealed-bid governmental-auction mechanisms. One is a score auction where the weights to dimensions are known to bidders, and another is a multidimensional beauty-contest, where sellers know the attributes valued by the buyer but not their weights. We contrast their performance with a laboratory experiment.

065-0973  The Sharing Newsboys
Ming Hu, Associate Professor, University of Toronto, Canada

We study resource sharing behavior among a network of connected newsboys. In order to investigate the impact of network structure on sharing behaviors.

065-1027  Signaling Supplier Risk Using a Buy-Back Contract
Shouqiang Wang, Assistant Professor, Clemson University, United States
Haresh Gurnani, Professor, Wake Forest University, United States

When using buy-back contracts, suppliers may be subject to exogenous risks that prevent them from honoring the return clauses. We examine whether an upstream manufacturer is able to signal its risk profile via the buy-back contract terms (i.e., the wholesale and return prices) offered to a retailer.

065-1720  Peer-To-Peer Product Sharing: Implications for Ownership, Usage, and Social Welfare
Saif Benjaafar, Professor, University of Minnesota, United States
Guangwen Kong, Assistant Professor, University of Minnesota, United States
Xiang Li, Student, University of Minnesota, United States

We consider a two-sided market consisting of product owners and renters, mediated by an online platform. Individuals decide on whether to be owners or renters and the platform decides on rental prices, commission rates, and membership fees. We compare product ownership and product usage with and without sharing.
The basic demand from enterprises towards academic education is to not only provide students methodological/theoretical knowledge, but also prepare them for the future tasks in the world of works! This contradicts academia's focus on sustainably teaching basic principles. With the extra-curricular international online program "ERP4Students", we successfully managed to bridge this "conflict-of-interest".

This research emanates from the latent problem that represents the fronts of development of this nation, on the one hand the demand of professionals resulting from higher education and furthermore the academic offerings that are provided in the country. So the question arises whether the Online education is the modality that satisfies the demand of education today, presenting the case of the National Autonomous University of Honduras (UNAH) as regulator of all academic initiatives in the country of the Higher Education.

Peer review is becoming a frequent form of assessment in higher education due to its beneficial effects on student learning. Yet, peer feedback is not always honest and fair. We show that increasing social distance can improve the critical nature of peer reviews in women, but not men.

This Project Management instructor has taught online, hybrid, and face-to-face (F2F) sections. The paper describes the differences between the students' attitudes and behaviors, and impacts on learning effectiveness in different delivery formats. This case study shows that the effectiveness of a particular assignment may vary with different delivery modes.

A buyer-supplier relationship is embedded in a network of interconnected firms who serve as an indirect control mechanism. The buyer and supplier can also foster norms of trust and reciprocity and use them as a direct control mechanism. Using data on 206 buyers and 116 suppliers, we examine the benefits and costs of both mechanisms.

Inter-organizational trust and learning are critical factors associated with successful supply chain innovation and long-term competitiveness. Our empirical analysis provides evidence that both trust and supply chain learning play important, but distinctive roles in developing an entrepreneurial and innovative supply chain organization.

We empirically test hypotheses derived from the literature on adoption of Supply Chain Finance (SCF) by buyers and their suppliers. We identify payment terms, annual spend, and the SCF interest rate as important drivers of adoption. Interestingly, we find that suppliers adopt SCF faster when buyers demand longer payment terms.

We investigate how the PSM function can enhance supply chain resiliency through managing and controlling intra- and inter-organizational issues in the emerging market. A multiple case study was conducted in four different supply chains. Three insights were revealed as crucial: PSM structure, risk management and knowledge acquired.

The Lean Office: An Organizational Change Perspective

The Lean Office: An Organizational Change Perspective
Lean principles, originally developed in manufacturing operations, have been adopted by organizations doing administrative work. Successful lean adoption in a labor-intensive context requires managing human resources through the process of change. We propose a framework for managing this transition and explore its application through a case study.

**065-0296** Leadership Capabilities during Lean Transformations  
Christian Haupt, Head of Business Excellence, TRW, Engineered Fasteners & Components, I E S E, Germany  
Tobias Engel, Professor, University of Applied Science Neu-Ulm, Germany

Lean transformations allow firms to strive towards operational excellence. As leadership involvement is key to any transformation, our framework is analyzing which leadership theory is most beneficial to lean initiatives. The output will help companies to implement lean leadership initiatives successfully and hence to strengthen their competitive advantage.

**065-1390** Diagnosing Organizational Culture: A Case Study in a Brazilian Company Acquired By A US Multinational  
Pedro Paro, Student, Universidade De Sao Paulo, Brazil  
Mateus Gerolamo, Assistant Professor, University of Sao Paulo, Brazil

This article presents an organizational culture diagnosis of a Brazilian company acquired by a US multinational. It uses a method of triangular culture evaluation based on The Competing Values Framework. Managers and researchers can learn from this experience as a contribution to using culture measurement to drive competitive advantage.

**065-0578** Development of International Kaizen Transfer Model  
Ai Qiang Li, Student, University of Buckingham, United Kingdom  
Pauline Found, Professor, University of Buckingham, United Kingdom

Researches have shown that (Japanese) companies are facing problems of transferring Kaizen to overseas subsidiaries. Based on literature findings and practices, this paper constructs an innovative conceptual framework of International Kaizen Transfer Model. It includes six interactive factors: Power Distance, Organization Structure, People, Employment System, Performance Management and Psychology Practice.

**065-0787** Risk Management Through Investment in Sustainable Energy Solutions  
Ali Shantia, Student, Hec Paris, France  
Sam Aflaki, Assistant Professor, Hec Paris, France  
Hamed Ghoddu, Assistant Professor, Stevens Institute of Technology, United States

We frame investment in energy efficiency (EE) and renewable energies (RE) as hedging mechanisms against volatile input prices. The optimal EE and RE decisions are analyzed for both monopolistic and duopoly market structures. Among other results, we show that pricing/production flexibility in response to uncertainty lowers the incentive to improve EE.

**065-0936** Carbon Leakage: The Impact of Asymmetric Emission Regulation on Technology and Capacity Investments  
Kristel Hoen, Consultant, Quintiq, Netherlands  
Ximin (Natalie) Huang, . Georgia Institute of Technology, United States  
Tarkan Tan, . Eindhoven University of Technology, Netherlands  
Beril Toktay, . Georgia Institute of Technology, United States

Under carbon emission regulations with uncertain future emission prices, we study producers' decisions regarding investment in cleaner technology in a regulated region, and/or building production capacity in the unregulated region. We compare different anti-leakage policies both analytically and in a numerical study based on the European cement industry.

**065-1454** Carbon Tariffs: Effects in Settings with Technology Choice  
David Drake, Assistant Professor, Harvard University, United States

We explore how technology choice interacts with carbon tariffs, taxes equivalent to the carbon cost that would have been incurred had the goods been produced in the regulated region. We study environmental and welfare implications, with results that contradict widely-held beliefs and arguments that carbon tariffs are protectionist.

**065-1477** Dynamics of Capacity Investment in Renewable Energy Projects  
Nur Sunar, Assistant Professor, University of North Carolina Chapel Hill, United States  
John Birge, Professor, University of Chicago, United States

We study the capacity investment dynamics of a renewable power producer, using a continuous time Brownian model. We explicitly identify the optimal capacity investment strategy of a renewable power producer. Our analysis offers important insights to renewable power producers as well as firms that procure renewable energy.

**065-0079** How to Get the Conflict Out of the Mineral Supply Chain  
Han Zhang, Student, Indiana University Bloomington, United States  
Goker Aydin, Associate Professor, Indiana University, United States  
H. Sebastian Heese, Professor, Ebs Business School, Germany

A new legislation requires manufacturers to disclose their sources of "conflict minerals" - natural resources whose trade might finance conflicts. We study the effect of such interventions, using a model with mines, smelters, and manufacturers. We show the supply chain can be rendered conflict-free by penalizing a subset of manufacturers.
Friday, 05:00 PM - 06:30 PM

**065-1254** Bridging Dynamic Global Sourcing Relations with Knowledge Governance  
Claus Jorgensen, Associate Professor, Aarhus University, Denmark  
Ole Friis, Associate Professor, Aarhus University, Denmark

We explore how knowledge governance can be used for bridging global sourcing relations in the struggle to avoid the erosion of firm capabilities. Our research is based on longitudinal case studies of two Danish enterprises competing in the highly globalized textile industry.

**065-0186** Global Sourcing under Exchange-Rate Uncertainty  
Shahyr Gheibi, Student, Syracuse University, United States  
Burak Kazaz, Associate Professor, Syracuse University, United States  
Scott Webster, Professor, Arizona State University Tempe, United States

We study a firm's global sourcing decisions under exchange-rate and demand uncertainty. Our analysis identifies the set of optimal sourcing policies (onshore, offshore, and dual sourcing), and the conditions that lead to each policy. We also explore the impact of risk aversion and financial hedging on global sourcing policies.

**065-1814** The Impact of Quality Investment in Shared Sourcing  
Issariya Sirichakwal, Assistant Professor, Youngstown State University, United States  
Anupam Agrawal, Associate Professor, Texas A&M University College Station, United States

We investigate the problem of a buyer's investment in the quality of a shared supplier. Learning from a buyer's investment can spill over to other (competing) buyers. An empirical case is presented, and the problem is analytically examined to identify conditions affecting buyers' decision in quality improvement at shared suppliers.

**171** Friday, 05:00 PM - 06:30 PM, Parlor 224  
**Chair(s):** Deishin Lee  
Erkut Sonmez  
**Track:** Socially Responsible Operations

**065-0086** Converting Retail Food Waste into By-Product  
Deishin Lee, Assistant Professor, Boston College, United States  
Mustafa Tongarlik, Assistant Professor, Bogazici University, Turkey

We investigate how by-product synergy can mitigate food waste and how it interacts with other mechanisms for reducing waste (i.e., disposal fee and tax credit for donation) in a retail grocery setting.

**065-0090** Improving Food Bank Gleaning Operations: An Application in New York State  
Erkur Sonmez, Assistant Professor, Boston College, United States  
Deishin Lee, Assistant Professor, Boston College, United States  
Miguel Gomez, Associate Professor, Cornell University, United States  
Xiaoli Fan, Student, Cornell University, United States

We develop a stochastic optimization model to help food banks to improve their gleaning operations. Gleaning refers to collecting food from what is left in the fields after harvest, and donating the goods to food banks or pantries that service food insecure individuals.

**065-0228** Operations with Volunteers: Process Design for Mission Impact  
Joy Field, Associate Professor, Boston College, United States  
Tingliang Huang, Assistant Professor, Boston College, United States

For many non-profit organizations, the use of volunteers in their processes is integral to their mission. We study how to incorporate volunteer labor into the processes of a non-profit organization to maximize mission impact.

**065-0539** Extended Producer Responsibility (EPR) for Pharmaceuticals  
Isil Alev, Assistant Professor, Boston College, United States  
Atalay Atasu, Associate Professor, Georgia Institute of Technology, United States  
Ozlem Ergun, Associate Professor, Georgia Institute of Technology, United States  
Beril Toktay, Professor, Georgia Institute of Technology, United States

EPR-based policies have gained traction for managing pharmaceutical overage. We analyze the effectiveness Source Reduction and End-of-Pipe Control policies by developing a game-theoretic model of the pharmaceutical supply chain. Focusing on the factors that cause overages we identify the determinants of the effective policy and stakeholder perspectives.

**172** Friday, 05:00 PM - 06:30 PM, Parlor 274  
**Chair(s):** Ahmed Ghozien  
**Track:** General/Emerging Topics in Operations Management

**065-1401** Drones: Emerging Technology Implications in Supply Chain Management  
Sarah Schaefer, Assistant Professor of Supply Chain Management, University of Wisconsin Oshkosh, United States  
Seth Powless, Lecturer, University of Toledo, United States

Drone delivery technology commenced in its current form in the 1980's, having undergone several iterations of evolutionary maturation from reconnaissance mediums to delivery vehicles for retail use. We explore the implications and expected consequences of this evolving technology and identify opportunities for research and practice in supply chain management.

**065-2077** The impact of human capital and innovations on performance  
Emmanuel Ogunjemila, Student, obafemi awolowo university, Nigeria  
Oluseye Jedege, Senior Researcher, Obafemi Awolowo University, Nigeria  
Titilayo Olaposi, Senior Lecturer, Obafemi Awolowo University, Nigeria
This study assessed the impact of human capital and innovations on the performance of micro, small and medium technical enterprises in Nigeria. The study employed primary and secondary data sources. Data was analysed using econometrics techniques. The output from the study will serve as evidence for policy making for government.

065-2078 Mathematical model to mitigate planning fallacy and to determine the realistic estimate of completion time
Yamini Srinivasan, Student, Indian Institute of Technology Madras, India
Rahul Marathe, Associate Professor, Indian Institute of Technology Madras, India
Planning fallacy is the tendency to quote an optimistic delivery time to complete a project, which may result in procrastination of delivery of the entire supply chain. To resolve this, we mathematically model a game theoretic mechanism to suppress the planning fallacy and determine a realistic delivery time.

065-1924 Lodging Capacity Analytics for the Qatar 2022 FIFA World Cup
Ahmed G honiem, Associate Professor, University of Massachusetts Amherst, United States
Agha Ali, Professor, University of Massachusetts Amherst, United States
Mohammed Al-Salem, Associate Professor, Qatar University, Qatar
Lodging capacity analytics is important for small nations, such as Qatar, that host the FIFA World Cup. We develop an Analytics-Optimization framework that assesses the lodging preparedness of the host country under an array of likely scenarios.

065-0140 An Improved Self-Adaptive Harmony Search Algorithm for Joint Replenishment Problems
Lin Wang, Professor, Huazhong University of Science & Technology, China
Xiaoqian Zhou, Student, Huazhong University of Science & Technology, China
To solve joint replenishment problems (which are typical NP-hard problems) effectively and efficiently, we design an improved self-adaptive harmony search algorithm (ISHS). The proposed algorithm applies differential evolution mutation strategies to HS. Experimental results show that ISHS outperforms other start-of-the-art algorithms on both tested benchmark functions and typical JRP s.

065-0883 Optimal Order Up-To Level Quantities for Dependent Spare Parts
Sarada Sarmah, Student, Indian Institute of Technology Kharagpur, India
We determine the optimal stock of dependent spare parts in periodic review policy. Our results show that there is considerable reduction in stock level and total cost of inventory when associated spares are considered together in inventory management.

065-0638 Optimality of (s,S) Policies Under Poisson Demand Processes and General Cost Structures
San dun Perera, Assistant Professor, University of Michigan-Flint, United States
Ganesh Janakiraman, Professor, University of Texas Dallas, United States
Shun-Chen Niu, Professor, University of Texas Dallas, United States
We study a single-stage, continuous review inventory model where demands arrive according to a Poisson process and show that an (s,S) policy is optimal under minimal assumptions on the ordering/procurement and holding/backorder cost functions. Our proof is based on a lower bounding argument and requires minimal mathematical machinery.

065-1688 Optimizing Inventory’s Contribution to Profitability in a Regulated Utility: The Averch-Johnson Effect
David Miller, Professor, University of Alabama Tuscaloosa, United States
Charles Schmidt, Professor, University of Alabama Tuscaloosa, United States
Linda Li, Student, University of Alabama Tuscaloosa, United States
We built a dynamic NDEA model to investigate the existence of the A-J effect on a dynamic input - that is, inventory. The results motivate us to construct an analytical model of the inventory policy, controlling the purchase of additional inventory.
### Sessions for Saturday, May 07

**Saturday, 08:00 AM - 09:30 AM**

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Session Details</th>
</tr>
</thead>
</table>
| 065-0536   | Integrating Limited Data into Humanitarian Logistics Models for Adaptive Decision Making  
Kezban Yagci Sokat, Student, Northwestern University, United States  
We study the integration of new data streams into humanitarian logistics models. We utilize various imputation techniques to approximate incomplete information and adaptive decision making in limited data environments. We develop new routing models that explore alternate recourse strategies in stochastic modeling to advance dynamic relief response. |
| 065-1108   | Vehicle Management Policies under Stochastic Budget for Humanitarian Development Programs  
Felix Papier, Associate Professor, Essec Business School, France  
Mahyar Eftekhar, Assistant Professor, Arizona State University Tempe, United States  
Fleet management is known as a pivotal component of humanitarian service delivery. Considering essential constraints (e.g., budget uncertainty, and environmental conditions at the field), we design a heuristic to identify the optimal fleet sizing and mission fulfillment over time. The objective of our model is to minimize the social cost. |
| 065-1315   | Mission Impossible: Logistics and Supply Chain Management in the Humanitarian World  
Nonlanhla Dube, Student, University of Groningen, Netherlands  
The humanitarian sector is recognized as an extreme setting in logistics and supply chain management research. I examine extremes within this setting to understand the context better and to draw insights on crucial but under-explored issues. Complex emergencies, overlapping disasters, and highly insecure contexts are the focus areas. |
| 065-0622   | Variability in Labor Schedules: Effects on Customer Satisfaction and Employee Turnover  
Hyeon Seok Lee, Student, University of North Carolina Chapel Hill, United States  
Camilia Kuhnen, Associate Professor, University of North Carolina Chapel Hill, United States  
We demonstrate the impact of store managers’ incentive scheme on variability in labor schedule. We also find that such variability affects store performance metrics such as customer satisfaction and employee turnover. |
| 065-0814   | Social Media and Traffic: A Cross-Section Study  
Dennis Zhang, Student, Northwestern University, United States  
Ruomeng Cui, Assistant Professor, Indiana University Bloomington, United States  
We empirically study the relation between company’s online traffic, its own social media information, and its competitors’ social media information, as well as cross-industry information. |

### Chair(s):
- **Ruomeng Cui**

### Track:
- **Supply Chain Management**

---

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Session Details</th>
</tr>
</thead>
</table>
| 065-2046   | Student Paper Finalist  
This is the first finalist in the College of Supply Chain Management Student Paper Competition |

---

**Chair(s):** Harish Krishnan

**Track:** Supply Chain Management
184  185  186

Saturday, 08:00 AM - 09:30 AM  
Track: Healthcare Operations Management  
Session: Patient Choice in Healthcare

Chair(s): Mor Armony

065-0107  Incorporating Client Choice Into Facility Network Design of Preventive Cancer Screening Programs
Beste Kucukyazici, Assistant Professor, McGill University, Canada
Lijie Song, Assistant Professor, Zayed University, United Arab Emirates
Vedat Verter, Professor, McGill University, Canada
Yue Zhang, Assistant Professor, University of Toledo, United States

We present a study on preventive cancer screening network design. We integrate economic analysis and simulation optimization to gain insights into how to improve the performance of a preventive cancer screening program. We illustrate our methodology through a case study based on the breast cancer screening program in Montreal, Canada.

065-0604  The Impact of Online Ratings on Demand in Outpatient Care: Empirical Evidence Via Structural Estimation
Yuqian Xu, Student, New York University, United States
Mor Armony, Associate Professor, New York University, United States
Anindya Ghose, Professor, New York University, United States

We analyze a unique data set from one leading online appointment booking platform in the U.S. We propose a structural model to capture the non-price competition among doctors, taking into account user-generated content with text mining techniques. We investigate the impact of different service characteristics.

065-0629  Understanding Patient Preferences and Choice Behavior in Appointment Scheduling: A Behavioral Experiment Study
Nan Liu, Assistant Professor, Columbia University, United States
Stacey Finkelstein, Assistant Professor, City University of New York, United States
Margaret Kruk, Associate Professor, Harvard University, United States
David Rosenthal, Associate Professor, Columbia University, United States

We study patient preferences and choice behavior in scheduling outpatient appointments. By conducting discrete choice experiments on distinct populations, we identify heterogeneous patient preferences in several "operational" attributes (e.g., delay to care, flexibility in time and doctor choice) and individual-difference factors that can explain such heterogeneity.

065-1199  Are Patients Patient? The Role of Time to Appointment in Patient Flow
Nikolay Osadchiy, Assistant Professor, Emory University, United States
Diwas Kc, Associate Professor, Emory University, United States

We examine the effect of wait to appointment on patient flow - specifically, on a patient's decision to schedule an appointment and arrive for that session. Contrary to previously-reported findings, our results suggest that some wait can be beneficial for reducing no-shows.

Sat 186  08:00 AM - 09:30 AM, Salon 8  
Track: Healthcare Operations Management  
Session: Personalized Medicine: The New Frontier of Healthcare

Chair(s): Eva Lee

065-1584  The Affordable Care Act and Hospital Physician Hiring Decisions
WC Benton, Professor, Ohio State University, United States
Natasha Burns, Associate Professor, Ohio State University, United States

The implementation of the Affordable Care Act and Medicare reforms have tied hospitals' reimbursements to their ability to improve patient satisfaction, reduce the average length of stay (LOS), and prevent readmissions. We investigate the implications of the Affordable Care Act on increases in hiring hospitalists as a business strategy.
Regulatory agencies monitor approved consumer products for safety and reliability. Existing methods of monitoring pharmaceutical drugs suffer from several shortcomings and are geared towards identifying new/unknown adverse events. We propose a data-driven and statistically robust empirical approach to evaluating known/specific adverse events, and demonstrate it using a controversial FDA warning.

We investigate the relationship between cost-efficiency and quality of care for hospitals. We use two-stage estimation for the empirical analyses, applying the Bayesian Stochastic Cost Frontier approach for the first stage and Bayesian regression to explore the relationship between cost-efficiency and quality performance.

We investigate the effectiveness of vaccination to prevent outbreaks of infectious diseases, using the well-known SIR model. We characterize the vaccination fraction that optimizes the health benefit per vaccination. Next, we apply the results to the allocation question between multiple populations and show that switching populations is optimal.

We design a first-of-its-kind outcome-based decision support tool that couples a treatment-predictive-effect model with a planning model. The predictive model uncovers treatment effect based on pharmacokinetic-pharmacodynamic analysis of patient response to anti-diabetic drugs. This evidence is incorporated within a personalized-planning model for optimization. Resulting plans offer better outcome and lower cost.

We develop an integrated feedback-driven model to optimally determine (1) patient-specific target values for controllable disease risk factors and (2) when to schedule the next office visit and which tests to take, using a case study involving glaucoma.

The ACA has not stifled the growth of both domestic and overseas medical travel. Using diffusion theory as the underlying framework, our empirical study (n=2,168) examines the impact of healthcare consumers' characteristics on their perceptions of quality and cost of medical travel. Suggestions to improve providers' competitiveness are provided.

As travelers are paying more attention to health related options within their travel experience, more hotels have started to launch "wellness" programs. In this multi-case study research, we identify service operations-related research opportunities for wellness and health-focused programs in the hospitality industry.

We describe an ongoing study of factors affecting assessments of sustainable hospitals. Patient satisfaction has become increasingly important as new regulatory approaches link patient satisfaction with financial performance; social media provides platforms for patients to publicize their experiences. Meanwhile, environmental and social responsibility have become managerial concerns. We investigate how a prior conceptualizations of quality affect satisfaction with social and environmental healthcare initiatives.
065-0473 The Impact of Targeting on Quality Decisions

Amit Eynan, Professor, University of Richmond, United States
Benny Martin, Associate Professor, University of Waterloo, Canada

We investigate the impact of targeted coupons on quality choices in the presence of consumers with heterogeneous valuation of quality. In a monopoly setting, coupons lead to higher quality choices with decreased product differentiation, while in a duopoly setting coupons drive firms to slightly decrease their qualities.

065-0839 Selling to an Off-Price Retailer to Ration Inventory for Strategic Consumers

Moutaz Khouja, Professor, University of North Carolina Charlotte, United States
Xin Liu, Student, University of Science & Technology, China
Jing Zhou, Associate Professor, University of North Carolina Charlotte, United States

Strategic consumers are likely to delay purchases when retailers have large inventory. Retailers can reduce this inventory by selling some of it to off-price retailers. If an off-price retailer has many bargain-hunters, such a strategy may be beneficial to the retailer in mitigating the effects of strategic consumer behavior.

065-0970 A Generalized Model on Forecasting Repeat Sales

Ruixia Shi, Assistant Professor, University of California Long Beach, United States
Hongyu Chen, California State University Fullerton, United States

We propose a stochastic model to forecast customers' repeat purchasing. We extend the traditional mixture distribution model to the general situation, which fully captures customers' heterogeneity. The generalization is made possible through using the Gaussian quadrature. Our results show that the proposed method outperforms the traditional forecast methods.

065-1207 The Impacts of an Online Retailing Store for Fresh Goods

Xinyi Liu, Student, Fudan University, China
Jun Zhang, Associate Professor, Fudan University, China
Qiying Hu, Professor, Fudan University, China

We study the impact of a new online fresh goods retailer on the performance of an existing physical retailer that competes directly with the online retailer. We also study the impact of such an online store on the performance of the overall supply chain.

065-0178 Maximizing Profitability in Online Retail through Free-Shipping Threshold: A Model and Evidence

Gerard Cachon, Professor, University of Pennsylvania, United States
Santiago Gallino, Assistant Professor, Dartmouth College, United States
Joseph Xu, Student, University of Pennsylvania, United States

We present a data-driven online retail demand model to analyze the profit implication of free shipping threshold policies. We find that free shipping thresholds are effective when customers do not intertemporally substitute demand and when retailers face low cost of return and high cost of shipping relative to shipping revenue.

065-0314 Incorporating Customer Response in an Online-to-Offline Fulfillment Strategy

Elnaz Jalilipour Alishah, Student, University of Washington, United States
Yong-Pin Zhou, Associate Professor, University of Washington, United States

We study an omnichannel retailer that fulfills online customer orders using inventory from offline retail stores. We examine the practice of fulfilling from the nearest location and suggest other strategies in response to customer price and lead time preferences.

065-0506 Online Browsing Behavior and Conversion

Dayoung Kim, Student, Cornell University, United States
Vishal Gaur, Professor, Cornell University, United States

Online retailers have access to customers' browsing paths as well as the final sales data. We collect the click-stream data from multiple companies to better understand the purchasing behavior from browsing information.

065-0441 To Inform or Not to Inform: A Field Experiment on Inventory Decisions in Retailing

Anna-Lena Sachs, Assistant Professor, University of Cologne, Germany
Michael Becker-Peth, Assistant Professor, University of Cologne, Germany
Stefan Minner, Professor, Technische Universität München, Germany
Ulrich Thonemann, Professor, Universität zu Köln, Germany

Retail managers face the challenging task of determining order quantities for perishable products. We investigate which information is necessary to support ordering decisions. We randomly assigned stores of a large European retail chain to groups of managers and varied the level of available information.

065-1208 Service Orientation and Organizational Performance: Is Innovation a Missing Link?

Abdel Latef Anouze, Assistant Professor, QU, Qatar
Service orientation culture increasingly has been considered a key element of superior corporate performance. Organizational innovativeness is a potential mediator of this relationship. We investigate how orientation and innovation engage, if at all, in affecting organizational performance.

**065-1702 Are the "Primary" Service Quality Protocols Efficiently Achieve Around the Small, Medium and Large Honduran H
dustries?**
Cesar Ortega, Student, Universidad Nacional Autónoma de Honduras, Honduras
Jesus Argueta, Professor, Universidad Nacional Autonoma de Honduras, Honduras
Izumi Sandoval, Student, Universidad Nacional Autonoma de Honduras, Honduras
Taria Andino Ruiz, Student, Universidad Nacional Autónoma de Honduras, Honduras

The Honduras business scenario is under great financial stress due to the economic contraction that forced many companies to limit/condition their service quality protocols. Our analysis identifies a number of customer service best practices along the hotel sector landscape that are still used.

**065-1780 Service Quality Model for Engineering Educational Institutes in India**
Narendra Lakar, Student, Indian Institute of Technology Bombay, India
Karuna Jain, Professor, National Institute of Industrial Engineering, Mumbai, India

Service quality dimensions vary across geographic locations, culture, universities and disciplines. Engineering education is a high contact domain where technical and functional quality perceived by the students has to be balanced. We propose a service quality model for engineering education in India based on a qualitative study.

**065-2012 What Makes It Effective to Protect Service Employees from Bad Customers?**
Hyojeong Kim, Lecturer, Kyung Hee University, Korea, Republic of (South Korea)
Nagesh Murthy, Associate Professor, University of Oregon, United States
Kwangtae Park, Professor, Korea University, Korea, Republic of (South Korea)

Our research identifies the factors that stimulate the effects of bad customer protection practice in performance. Based on survey research in three industries in South Korea, we found that transformational leadership showed moderate effect on the performance of organizational identity and competitive perception.

**065-1699 Adaptability, Manufacturing Strategy, and Technology: Being Competitive Through Responsiveness**
Cesar Ortega, Student, UNIVERSIDAD NACIONAL AUTONOMA DE HONDURAS, Honduras
Maria Lopez, Student, UNIVERSIDAD NACIONAL AUTONOMA DE HONDURAS, Honduras
Jose Machuca, Professor, Universidad De Sevilla, Spain
Pedro Garrido-Vega, Associate Professor, Universidad De Sevilla, Spain

We offer a more systemic understanding of interrelations from production programs, such as manufacturing strategy, technology and adaptability, impacting responsiveness. We test links among production practices for more rapid responses, using a PLS and SEM model with data from 233 plants worldwide.

---

**Saturday, 08:00 AM - 09:30 AM, Edelweiss**
**Session:** Operations Analytics and Optimization for Smart Industry
**Chair(s):** Lixin Tang

**Track: Scheduling and Logistics**

**065-0747 Operations Analytics and Optimization for Smart Industry**
Lixin Tang, Professor, Northeastern University, China
Feng Li, Student, Northeastern University, China

We discuss analytics and optimization technology to meet emerging challenges from Smart Industry. Smart Industry includes simultaneously managing enterprise-wide production, logistics planning, batch scheduling, process operation analytics, and optimization. We discuss applications in the iron & steel, petrochemical, energy, and mining industries, as well as port operations.

**065-0748 Solving Practical Integrated Production and Delivery Scheduling Problems**
Feng Li, Student, Northeastern University, China
Lixin Tang, Professor, Northeastern University, China
Zhi-Long Chen, Professor, University of Maryland, United States

We study practical integrated production and delivery scheduling problems. The objective is to find a joint schedule of job processing and delivery of completed jobs to customer sites, so as to optimize delivery timeliness and total transportation cost performance.

**065-0780 Latest Developments in Supply Chain Scheduling**
Zhi-Long Chen, Professor, University of Maryland, United States

Supply chain scheduling is a relative new research area. A lot of research has been done in the last fifteen or so years. In this talk, I discuss latest developments in this area focusing on the problems and results that have appeared in the last five years.

**065-1182 Continuous-Time Formulation for Scheduling with Batching Decisions and Energy Constraints**
Wenjie Xu, Student, Liaoning Key Laboratory of Manufacturing System and Logistics, The Logistics Ins, China
Lixin Tang, Professor, Northeastern University, China

We develop a unit-specific event-based continuous-time mixed integer linear modeling for the scheduling problem with batching decisions and energy constraints. Such problems arise in steelmaking with continuous casting production. To solve the problem, we propose a combination of a global optimization algorithm, aBB, and a stochastic algorithm, Differential Evolution.

**065-1719 Ideal Schedules on Parallel Machines**
Kangbok Lee, Assistant Professor, City University of New York, United States
Michael Pinedo, Professor, New York University, United States
Joseph Leung, Professor, New Jersey Inst of Technology, United States

We study the problem of scheduling equal processing time jobs on identical parallel machines. An ideal schedule is referred to as a schedule minimizing both maximum and total completion times simultaneously. We investigate existence of ideal schedules and the algorithms for ideal schedules under different job characteristics.
Anssi Kaki, Development Manager, UPM-KymiMene Ltd., Finland
Katarina Kemppainen, Professor, Aalto University, Finland
Juuso Liesio, Assistant Professor, Aalto University, Finland

We analyze hundreds of daily hydropower production planning decisions where electricity worth $50,000 is sold to a spot market. These decisions are taken under uncertain prices, strict timetable, and capacity constraints. By analyzing optimization results, actual decisions, and planner feedback, we evaluate the combined impact of modeling and expert judgment.

065-1718  Service Refusals in Supply Chains
Alex Scott, Student, Penn State University University Park, United States
Christopher Parker, Assistant Professor, Penn State University University Park, United States
Christopher Craighead, Professor, University of Tennessee Knoxville, United States

Contracts in the for-hire trucking industry are unusual in that, while they establish prices for different services, there is typically no legally-binding obligation or penalty for either party to offer or accept a load. We examine when and why truckload carriers refuse to provide service at pre-established prices.

065-1650  The Effectiveness of Supplier Buy Back Finance: Theory and Evidence
Weiming Zhu, Student, University of Maryland, United States
Tunay Tunca, Professor, University of Maryland, United States

Facing a budget-constrained buyer, a novel approach for large suppliers is adopting buy-back financing schemes to relieve their downstream partners and reduce channel costs. We both theoretically and empirically analyze the efficiency of these financing schemes, and explore their impact on operational decisions and contract design.

065-1744  Are Government Recalls a Deterrent? Evidence from the U.S. Auto Industry
AHMET COLAK, Student, Northwestern University, United States
Robert Bray, Assistant Professor, Northwestern University, United States

We investigate whether government-initiated recalls are a deterrent for the automakers. Hence, we develop the first dynamic, micro-econometric model of product recalls. We study 13,680 auto recalls and 957,566 consumer complaints from 1994 to 2015. Our structural estimates suggest that regulator recalls are less costly and not preemptive for the automakers.

065-1299  Integrated Cross-Dock Scheduling and Assignment
René De Koster, Professor, Rotterdam School of Management, Netherlands
Arpan Rijal, Student, Erasmus University Rotterdam, Netherlands
Marco Bijvank, University of Calgary, Canada

Companies use cross docking to simultaneously minimize transport and inventory holding costs. We study scheduling and dock assignment of inbound and outbound trucks at an LTL cross-dock. Tests on instances based on the operations of a Dutch retailer reveal that the integrated model can vastly reduce internal travel distances.

065-0109  Collaborative Airport Surface Scheduling for Competing Stakeholders
Soumia Ichoua, Professor, 1979, United States

We address the problem of scheduling aircraft departures in a surface CDM setting. Various stakeholders with conflicting goals need to collaborate for an optimal use of shared limited resources. We propose an optimization procedure that seeks to achieve a good trade-off between overall system efficiency and optimal individual stakeholders’ goals.

065-1203  Minimizing Waiting Time in Last Mile Delivery for a Smart City
Lindawati, Researcher, SAP Research and Innovation Center, Singapore
Aldy Gunawan, Reader, School of Information Systems, Singapore

Customers consider a reliable and on-time last mile delivery in Omni-channel business as important as the product's price and quality. We focus on minimizing the waiting time for customers and carriers in last mile delivery. We model the problem as an optimization problem and develop Genetic Algorithm to solve it.

065-0957  Forward-Reserve Storage in a Miniload Automated Storage/Retrieval System
Wan Wu, Student, University of Science and Technology of China, China
Yugang Yu, Professor, University of Science and Technology of China, China

We divide the miniload AS/RS rack into two regions: the forward region includes a few pallets for order-picking while the reserve region contains randomly located pallets for replenishment. We compare it with class-based storage to find under which conditions the expected response time for our policy is shorter.

065-0494  Applied Competitive Intelligence in Procurement Process - A Case Study
Danielle Miquilim, Student, Universidade Paulista - Unip, Brazil
Marcia Terra da Silva, Professor, Universidade Paulista - Unip, Brazil

We analyze hundreds of daily hydropower production planning decisions where electricity worth $50,000 is sold to a spot market. These decisions are taken under uncertain prices, strict timetable, and capacity constraints. By analyzing optimization results, actual decisions, and planner feedback, we evaluate the combined impact of modeling and expert judgment.
065-1948  Purchasing Strategies of Small and Medium Sized Enterprises (SMEs)
Seung-Kuk Paik, Associate Professor, California State University Northridge, United States
We examine the distinct purchasing strategies of small and medium sized enterprises (SMEs) under the two dimensions of the Kraljic's purchasing portfolio matrix. The two dimensions include profit impact and supply risk. Our study found that the majority of SMEs' purchases belong to the leverage category.

065-0797  How Much to Open, How Fast to Fix? Effects of Openness on the Development and Maintenance of Software
Emre Demirezen, Assistant Professor, Binghamton University, United States
Rakesh Mallipeddi, Student, Texas A&M University College Station, United States
We study how much to open the software source code, and how fast to fix the issues reported by users. By analyzing the open source code of 12,000 projects, we find that projects with more openness and faster fix times tend to have higher developer productivity, but also suffer from higher bug rates, as well as increased maintenance costs due to more developed codebases.
<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
<th>Authors</th>
<th>Abstract</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-1171</td>
<td>How Interactive Feature Shapes Online Marketplaces: A Case of Amazon Answer</td>
<td>Warut Khem-am-nuai, Ph.D. Candidate, Purdue University, United States; Hossein Ghasemkhani, Assistant Professor, Purdue University, United States; Karthik Kannan, Professor, Purdue University, United States</td>
<td>We first empirically show that opening up a software reduces the time to fix defects. We complement this empirical study with an optimal control theory model to study the behavior of the software vendor in allocating efforts to new software development and fixing defects – most importantly, the extent of openness.</td>
</tr>
<tr>
<td>065-1345</td>
<td>To Be or Not to Be Social: Socially Embedded Marketplace Design</td>
<td>Rajiv Mukherjee, Assistant Professor, Southern Methodist University, United States; Karthik Kannan, Professor, Purdue University, United States</td>
<td>We use data from two online shopping platforms to investigate the economics implications of the question &amp; answer system. Interestingly, we find that question elements have a negative impact on sales while answer elements, particularly the depth of the answers, have a positive impact on sales.</td>
</tr>
<tr>
<td>065-0040</td>
<td>Formation and Design of a Publicly Funded Innovation Network</td>
<td>Zoran Perunovic, Associate Professor, Technical University of Denmark, Denmark; Magnus Gary, Program Manager, BlueINNOShip, Denmark; Melanie Kreye, Assistant Professor, Technical University of Denmark, Denmark</td>
<td>We look into formation and design elements of a maritime innovation network, like motivations to join, selection of partners, design of work packages, centrality of organizations, structural holes, and governance mechanisms. We analyze the impact of these on the progression of technology readiness levels of 14 technologies being developed in the network.</td>
</tr>
<tr>
<td>065-0653</td>
<td>Theoretical Considerations to Reduce Anomalies from the Globalization of Innovation</td>
<td>Aglaya Batz, Student, Brandenburg University of Technology, Germany; Herwig Winkler, Associate Professor, Brandenburg University of Technology, Austria</td>
<td>Globalization of innovation offers advantages by acquiring innovation's main element: Knowledge. However, organizations still fail in appropriating and absorbing the outcomes of exogenous innovation activities. To minimize these anomalies resulting from the externalization of innovation, network arrangements and internal organizational structures should be adjusted according to the singularities of project's innovation-model.</td>
</tr>
<tr>
<td>065-1909</td>
<td>Network Topologies to Manage the Globalization of Innovation</td>
<td>Aglaya Batz, Student, Brandenburg University of Technology, Germany; Herwig Winkler, Associate Professor, Brandenburg University of Technology, Austria</td>
<td>Organizations are bound together in collaboration networks without acknowledging the challenges generated by network-structures. Collaboration networks financed by German ministries between 2007 and 2014 producing social, radical and incremental innovations were analyzed to characterize these networks. Our findings contribute to the understanding of the interrelationship between network topologies and innovation.</td>
</tr>
<tr>
<td>065-1270</td>
<td>Dynamic Inventory Management with Total Minimum Commitments and Two Supply Options</td>
<td>Tong Wang, Student, The Chinese University of Hong Kong, Hong Kong; Xiling Gong, Assistant Professor, The Chinese University of Hong Kong, Hong Kong; Sean Zhou, Associate Professor, Chinese Univ of Hong Kong, Hong Kong</td>
<td>We study optimal policies for dual-supply inventory systems where a firm commits to buying a total minimum quantity from both supplies or two separate total minimum quantities from each supply over a finite planning horizon. Using a decomposition technique and multi-modularity, we characterize optimal control policies under different commitments.</td>
</tr>
<tr>
<td>065-1800</td>
<td>Optimal Policies for Inventory Systems with a Limited Number of Free Replenishments</td>
<td>Geoffrey Bryan Chua, Assistant Professor, Nanyang Technological University, Singapore; Onur Klic, Assistant Professor, University of Groningen, Netherlands</td>
<td>We consider a finite horizon period-review stochastic inventory system with a limited number of free replenishments over the planning horizon. We are able to characterize the optimal ordering policy using a new structural property called convex dominance, which generalizes convexity and k-convexity.</td>
</tr>
<tr>
<td>065-1808</td>
<td>Push vs. Pull: Choosing the Right Strategy for Inventory and Speed Tradeoff</td>
<td>Xiang Zhu, Assistant Professor, University of Groningen, Netherlands</td>
<td>We consider the design and control of a two-stage system. We construct a model for the optimal lead-time and stock level that minimize the total operational cost. We find that the optimal policy depends on the utilization at the upstream stage regardless of the downstream stage.</td>
</tr>
<tr>
<td>065-1994</td>
<td>Multi-Item Inventory Systems with Capacity Constraint on the Major Setup</td>
<td>S. Viswanathan, Professor, Nanyang Technological University, Singapore</td>
<td>We find the optimal policy depends on the utilization at the upstream stage regardless of the downstream stage.</td>
</tr>
</tbody>
</table>
We consider multi-item inventory systems with joint replenishment costs and capacity constraint on the quantity of all items replenished together in a major setup. We develop heuristics based on power-of-two policies for this problem. We develop efficient upper bounds for the heuristic, and also address the problem with stochastic demand.

<table>
<thead>
<tr>
<th>Track: Innovation, Learning and Technology Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session: Managing Technological Innovations</td>
</tr>
<tr>
<td>Chair(s): Tonny Rodrigues</td>
</tr>
<tr>
<td><strong>065-0213</strong> Customization of Cars: Meanings Associated with Technological Innovation in Automotive Cultural Texts</td>
</tr>
<tr>
<td>Tonny Rodrigues, Associate Professor, COPPEAD Graduate Business School / Federal University of Rio de Janeiro, Brazil</td>
</tr>
<tr>
<td>Nicole Fortes, Student, Faculdade Santo Agostinho, Brazil</td>
</tr>
<tr>
<td>Átila Lira, Associate Professor, Universidade Paulista - Unip, Brazil</td>
</tr>
<tr>
<td>Acácio Silva Júnior, Associate Professor, Faculdade Mauricio de Nassau, Brazil</td>
</tr>
<tr>
<td>This research aims to analyze the process of technological innovation in the production and consumption of customized cars in cultural texts. The results show symbolic meanings associated with the use of custom cars. This information brings contributions to the production of automobiles, attending the needs of consumer practices influenced by the prestigious imitation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Track: Global Supply Chain Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session: Perspectives on Global Supply Chain and Innovation Management</td>
</tr>
<tr>
<td>Chair(s): Anant Mishra</td>
</tr>
<tr>
<td><strong>065-0353</strong> Won't Leave You at the Alter: Designing Alternative Mechanisms for Startup Supply Chain Development</td>
</tr>
<tr>
<td>Berke Guzelisu, Student, Questrom School of Business, United States</td>
</tr>
<tr>
<td>Brad Kyungmin Lee, Student, Boston University, United States</td>
</tr>
<tr>
<td>Nilesh Joglekar, Associate Professor, Boston University, United States</td>
</tr>
<tr>
<td>Startup supply chain development spans two stages, early experimentation without revenue followed by production scale-up and revenue generation. Early experimentation opens single sourcing with another startup, while production offers dual sourcing opportunity. We explore alternative mechanisms for startup supplier alignment across both stages using a game theoretic framework.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Track: Global Supply Chain Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session: Perspectives on Global Supply Chain and Innovation Management</td>
</tr>
<tr>
<td>Chair(s): Anant Mishra</td>
</tr>
<tr>
<td><strong>065-0890</strong> Cultural Effects on Digital Asset Protections</td>
</tr>
<tr>
<td>Brett Massimino, Cornell University, United States</td>
</tr>
<tr>
<td>John Gray, Ohio State University, United States</td>
</tr>
<tr>
<td>We investigate the cultural characteristics of organizations engaged in the development and distribution of software products, and relate these to the illicit distribution activities for these goods. Our empirical analyses utilize longitudinal data on the black-market distributions of electronic video game products.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Track: Global Supply Chain Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session: Perspectives on Global Supply Chain and Innovation Management</td>
</tr>
<tr>
<td>Chair(s): Anant Mishra</td>
</tr>
<tr>
<td><strong>065-1187</strong> Examining the Influence of Operational Technostress on Innovation</td>
</tr>
<tr>
<td>Shirish C. Srivastava, Associate Professor, HEC Paris, France</td>
</tr>
<tr>
<td>Shalini Chandra, Assistant Professor, S P Jain School of Global Management, Singapore</td>
</tr>
<tr>
<td>Anuragini Shirish, Student, Télécom Ecole de Management (Institut Mines-Telecom), France</td>
</tr>
<tr>
<td>Technostress, or the stress generated in employees because of using everyday operational technologies in organizations, can influence their innovation performance. Grounding our research in &quot;Transactional Model of Stress and Coping,&quot; we examine the linear as well as non-linear relationships between technostress creators and employee innovation and delineate useful implications.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Track: Global Supply Chain Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session: Perspectives on Global Supply Chain and Innovation Management</td>
</tr>
<tr>
<td>Chair(s): Anant Mishra</td>
</tr>
<tr>
<td><strong>065-1244</strong> Operations Performance Measurement Through the Use of Computing</td>
</tr>
<tr>
<td>Ricardo Machado, Senior Lecturer, Pontifical Catholic University of Goias, Brazil</td>
</tr>
<tr>
<td>Richard Telles, CEO, Pontifical Catholic University of Goias, Brazil</td>
</tr>
<tr>
<td>Business operations are widely supported by software. However, at times they cannot fulfill their purpose due to lack of a procedure that measures the software’s performance. In this research, we propose a tool to maximize the use of the company’s software, to correct and guide their users.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Track: Global Supply Chain Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session: Perspectives on Global Supply Chain and Innovation Management</td>
</tr>
<tr>
<td>Chair(s): Anant Mishra</td>
</tr>
<tr>
<td><strong>065-1282</strong> Are Good Idea Generators Also Good at Evaluating Ideas?</td>
</tr>
<tr>
<td>Otso Massala, Student, INSEAD, Singapore</td>
</tr>
<tr>
<td>Karan Girotra, Professor, INSEAD, France</td>
</tr>
<tr>
<td>Using data collected from a series of innovation tournaments, we relate different business opportunity generation skills with evaluation skills. We provide implications for design of innovation tournaments and innovative organizations.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Track: Global Supply Chain Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session: Perspectives on Global Supply Chain and Innovation Management</td>
</tr>
<tr>
<td>Chair(s): Anant Mishra</td>
</tr>
<tr>
<td><strong>065-1801</strong> Managing Logistics Outsourcing to China: Business Problems and Solutions for Australian Firms</td>
</tr>
<tr>
<td>Jeffrey Wang, Lecturer, Victoria University, Australia</td>
</tr>
<tr>
<td>Ian Sadler, Senior Lecturer, Victoria University, Australia</td>
</tr>
<tr>
<td>Himanshu Shee, Senior Lecturer, Victoria University, Australia</td>
</tr>
<tr>
<td>Our framework embodying outsourcing situations in Australia leverages the decision on what products and components should be outsourced to China. Empirical data from firms from China were collected by a questionnaire survey as well as eight interviews. Our results agree that outsourcing can achieve many significant benefits.</td>
</tr>
<tr>
<td>Session</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>065-0141</td>
</tr>
<tr>
<td>065-0438</td>
</tr>
<tr>
<td>065-0866</td>
</tr>
<tr>
<td>065-1210</td>
</tr>
<tr>
<td>065-1054</td>
</tr>
<tr>
<td>065-1430</td>
</tr>
<tr>
<td>065-0884</td>
</tr>
<tr>
<td>065-1314</td>
</tr>
</tbody>
</table>
Disruptions in Procurement

Managing supply chain risk is vital for companies in today's economy. Looking at disruptions in the procurement process, we discuss possible mitigation strategies as well as effects on buyer/supplier reputation.

The Roles of Corporate Culture in the Selection of Effective Risk Management Strategies

We investigate the influences of corporate culture on different types of risk management strategies within global SCM. We consider risk management strategies in association with corporate culture (disruption, customer and quality orientations) and risk management capability by a PLS-SEM analysis of large-scale survey data.

Impact of Lean Manufacturing Practices on Supply Chain Risk

We use a large unstructured database of user-reported adverse events to predict failures of medical devices. In the process we identify several important sources of failures and the interaction of those sources in predicting the risk of failure of medical devices. We also identify decision bias in firms.

Auto Recalls: A Game of Chicken

We model a manufacturer's and regulator's joint recall decisions as a dynamic game. We estimate our model with 14,124 recalls and 976,062 defect reports. We find initiating recalls is a game of chicken: The agents want faulty products off the road but hold out for the other to act.

Proximity and the Supply Chain

By merging two novel datasets from the automotive supply chain, we look at optimal proximity strategies between the physical and executive branches (i.e. the headquarters and production plants) of the downstream and upstream partners.

The Impact of Cost- and Revenue-Sharing Contracts on Environmental Innovation in a Supply Chain

We study a two-echelon supply chain with an upstream supplier investing in an environmental innovation (with cost-saving and demand-enhancing effects) and a downstream retailer selling to consumers. We examine the implications of cost-sharing and revenue-sharing contracts (and bargaining) between two firms.
We study different stages in electric vehicle industry development and three recycling models for electric vehicle batteries. We consider the decisions of the battery manufacturer as the Stackelberg leader and the impact on recycling channels in four different life cycle periods.

065-1195 Fostering Responsibility in Supply Chains: Are Existing Practices Effective?
Avijit Raychaudhuri, Student, Nanyang Technological University, Singapore
Fang Liu, Assistant Professor, Nanyang Technological University, Singapore
S. Viswanathan, Professor, Nanyang Technological University, Singapore

With the incessant expansion of supply chains, global buyers continue to source from suppliers with varying degrees of responsibility. However, responsibility violations committed by suppliers expose the buyers to significant external pressure. We analyze the efficacy of such pressure and suggest a more effective mechanism for improving supply chain responsibility.

065-0960 Subsidy Scheme or Price Discount Scheme? Mass Adoption of Electric Vehicles Under Different Market Structures
Lulu Shao, Student, Huazhong University of Science & Technology, China
Jun Yang, , Huazhong University of Science & Technology, China

We analyze the hybrid electric-and-gasoline vehicle market in both monopoly and duopoly settings. Taking social welfare into account, and considering government offers subsidy and price-discount schemes, we formulate a utility model to find optimal subsidies for government and the optimal pricing strategy for manufacturers.

065-0298 Environmental Governance and the WHO Guidelines for Cargo Transportation in Brazil
Washington Luiz Soares, Student, UNISANTOS, Brazil
Ana Carla de Toledo, Student, UNISANTOS, Brazil
Norma Padilha, Professor, UNISANTOS, Brazil

This paper evaluates the harmful health implications of cargo transportation. We highlight the issues using a World Health Organisation case study of the transport sector.

065-0835 Evaluating Corporate Carbon Disclosures in Comparison to Supply Chain Emissions
Anthony Craig, Assistant Professor, Iowa State University, United States

We present a method to evaluate corporate carbon disclosures in relation to the overall carbon impact of the supply chain. We apply this methodology to companies with public disclosures and compare the results to the disclosure and performance scores of those firms given by the Carbon Disclosure Project.

065-1428 Safety Stock Placement in Supply Chains with Demand Forecast Updates
Youssef Boulaksil, Assistant Professor, United Arab Emirates Univ, United Arab Emirates

We develop an approach to determine the safety stock levels in supply chains that face demand uncertainty. We model customer demand following the Martingale Model of Forecast Evolution. A numerical study reveals that safety stocks should be mainly placed downstream in the supply chain to achieve a high service level.

065-1770 The Data-Driven (s,S) Policy: Why You Can Have Confidence in Censored Demand Data
Gah-Yi Vahn, Assistant Professor, London Business School, United Kingdom

I revisit the classical dynamic inventory management problem of Scarf (1959) from a distribution-free, data-driven perspective. I propose a nonparametric estimation procedure for the optimal (s, S) policy that yields an asymptotically optimal policy and analytically derive confidence intervals for this policy.

065-1448 In Search of the Optimal Level of Demand: Data Granularity in Inventory Management
Alp Akcay, Assistant Professor, Eindhoven University of Technology, Netherlands
Shridhar Tayur, Professor, Carnegie Mellon University, United States
Bahar Biller, Senior Scientist, General Electric, United States
We address the practical situation of demand-data aggregation in managing inventory when there is incomplete information about the demand model. Considering the cost of statistical errors in demand-model estimation, we identify and strive to balance a trade-off between setting the aggregation time bucket too wide or too short.

### Session: Advances in Revenue Management with Consumer Choices

**Track:** Revenue Management and Pricing

**Chair(s):** Ruxian Wang, Srikanth Jagabathula

### 065-0363
**Title:** The Impact of Consumer Search Cost on Assortment Planning and Pricing
**Authors:** Ruxian Wang, Assistant Professor, Johns Hopkins University, United States

Consumers search for product information to resolve valuation uncertainties before purchase. The assortment problems are generally NP-hard, so we develop efficient exact and approximation algorithms for markets with homogeneous and heterogeneous consumers. For joint assortment planning and pricing problems, we show the intrinsic-utility-ordered assortment and the quasi-same-price policies are optimal.

### 065-0754
**Title:** Assortment Optimization with Product Costs and Constraints
**Authors:** Victor Martínez-de-Albéniz, Associate Professor, I E S E, Spain
Sumit Kunnumkal, Assistant Professor, Indian School of Business, India

We consider the assortment optimization problem under the MNL model with product fixed costs and constraints. We propose a new method to obtain an upper bound on the optimal expected profit. We show that our method is tractable and has provable performance guarantees for some common types of assortment constraints.

### 065-1624
**Title:** Assortment Optimization over Time
**Authors:** James Davis, Assistant Professor, University of Illinois Urbana-Champaign, United States
Huseyin Topaloglu, Associate Professor, Cornell University, United States
David Williamson, Professor, Cornell University, United States

Inspired by online retail, we introduce a new type of assortment optimization problem: assortment optimization over time. In this problem the retailer must choose which products to display but must also choose an ordering for the products. We provide a framework to analyze this problem and provide efficient algorithms.

### 065-2004
**Title:** A Case-Control Approach to Estimate Choice Models with Censored Sales Data
**Authors:** Zuozheng Wang, Student, University of Maryland, United States

When only sales data from a single firm is accessible, it is challenging to jointly estimate customer choice parameters and overall market size. We propose a modified case-control approach with missing data using an Expectation-Maximization algorithm. Unlike previously proposed algorithms, ours doesn’t rely on restrictive demand arrival assumptions.

### Session: Satisfaction and Service Quality

**Track:** Service Operations

**Chair(s):** Gang Li

### 582
**Title:** A Decision Support System for Analyzing Patient Satisfaction Surveys
**Authors:** Sheneeta White, Associate Professor, University of St. Thomas, United States
Robert Russell, Professor, Virginia Polytechnic Institute And State University, United States
Dana Johnson, Professor, Michigan Technological University, United States

We present a DSS that allows decision makers to analyze patient satisfaction survey results. We propose the situation in which a healthcare provider has survey results generated from the CAHPS® survey and wants to perform a statistical analysis on quality outcomes. The main decision is the prioritization of quality outcomes.

### 065-0749
**Title:** Differential Effect on Overall Quality of Stages in a Service Experience
**Authors:** Namkyung Lee, Student, Korea University, Korea, Republic of (South Korea)
Hojung Shin, Professor, Korea University, Korea, Republic of (South Korea)

In a service experience, efficient SOM implementation requires knowing where to focus improvement efforts. Because of the heterogeneity of service experience, we classify both the experience stages and customers in order to examine the differential effect of experience stage on overall quality.

### 065-1797
**Title:** Integrating Front-Office and Back-Office Operations: A Systemic Approach to Service Process Design
**Authors:** Gang Li, Assistant Professor, Bentley University, United States
Joy Field, Associate Professor, Boston College, United States
Mark Davis, Professor, Bentley University, United States

To address customers' increasing expectations for both reasonably priced services and short waiting times, we propose a design approach that breaks the boundary of back-office and front-office operations and can provide faster and more efficient service, while also being extremely simple to implement in practice.

### 065-0378
**Title:** Customer Satisfaction of Electric Power Services: A Research Agenda
**Authors:** Maria Eduarda Souza, Student, Pontifical Catholic University of Parana, Brazil
Ana Gloria Abrão, Student, Pontifical Catholic University of Parana, Brazil
Edson Pinheiro de Lima, Associate Professor, Pontifical Catholic University of Parana, Brazil

The present work develops a research agenda based on a systematic literature review of customer satisfaction in household electrical power supply services, based on the Cochrane method. Research trends could be identified through the lens of service operations, and they are presented as social networks and bibliometric analysis.
### Session 598: Innovations in Selling Strategies

**Chair(s):** Sina Zare

<table>
<thead>
<tr>
<th>Presentation</th>
<th>Title</th>
<th>Abstract</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-1052</td>
<td>Attitudinal Dynamics Strategies Planning For Indian Industrial Success (Vision2025)</td>
<td>Industrial development today is considered as prerequisite for modern economic development. If we aim at an accurate assessment of our achievement, we should analyze the attitude of our Human resources with in industry. We should measure our achievement in terms of our present targets with this dimension.</td>
</tr>
<tr>
<td>065-0018</td>
<td>Inverse Optimization Decision Making Method on &quot;Person-Job&quot; Safety Match</td>
<td>This project constructs a new model for the best use of human resources under the condition of safety operation. It provides a new thought for the following decision making problem: the decision target value is known, and parameters are changeable.</td>
</tr>
<tr>
<td>065-1592</td>
<td>The Relationship between Social Capital and Buying Firm’s Performance</td>
<td>We witness that the buyer-supplier relationship has received considerable attention in the supply chain management literature over past two decades. In this study, we try to investigate the strategic advantages that buyers obtain through developing social capital with their suppliers.</td>
</tr>
<tr>
<td>065-0576</td>
<td>Reshaping Resource Management</td>
<td>Traditionally the HR Department and Industrial Engineering are totally separated in a manufacturing-focused environment. HRM manages the resources of talents while IE handles all manufacturing resources within the company. This paper explores the practicability of integrating the HRM and IE for better resources management in manufacturing.</td>
</tr>
<tr>
<td>065-0856</td>
<td>Package Size and Pricing Decisions with a Bulk Sale Option</td>
<td>We investigate the package size and pricing decisions of a retailer selling a perishable product to a population of heterogeneous consumers who differ in their valuation of the product. We also study the pricing decision when the retailer sells the product in bulk and compare bulk sale with package sale.</td>
</tr>
<tr>
<td>065-0930</td>
<td>Selling Strategies in Response to Online Consumer Reviews from Activists</td>
<td>Product review posters can exhibit differentiation behavior in their evaluations in online marketplaces. Such differences can influence the evolution of the ratings environment. We examine the relationship between the evolution of the ratings environment and dynamic pricing decisions of a monopolist.</td>
</tr>
<tr>
<td>065-0980</td>
<td>Dynamic Stimulus in Crowdfunding</td>
<td>We study the dynamics of online crowdfunding in which a campaign would fail unless a predetermined funding goal is achieved within a given duration. Potential funders with heterogeneous private willingness-to-pledge arrive in a random fashion and make pledging decisions by taking into account the campaign’s success rate. We demonstrate the significant benefit of dynamically offering stimulus, depending on the time- and pledge-to-go, by analyzing several policies, such as seeding, feature upgrade and promotional discount. We illustrate the stimulus policies’ benefits by using failed funding projects from Kickstarter.</td>
</tr>
<tr>
<td>065-1184</td>
<td>Advance Selling to Strategic Consumers: Preorder Contingent Pricing or Preorder Contingent Production?</td>
<td>Motivated by emerging industry practices, we study the effectiveness of two new advance selling strategies in counteracting strategic consumer behavior: the preorder contingent production strategy and the preorder contingent pricing strategy.</td>
</tr>
</tbody>
</table>
### 065-0257 Strategic Stocks for Joint Prepositioning - Predicting Future Demand in Refugee Emergencies

Ozlem Ergun, Associate Professor, Georgia Institute of Technology, United States  
Marianne Jahre, Professor, 1979, Norway  
Joakim Kembro, Student, Lund University, Sweden  
Svein Haapnes, Senior Business Analyst, Global Supply Chain, UNHCR, Hungary  
Mats Hultgren, Chief Supply Operations, UNHCR, Hungary

The paper builds on a model developed with UNHCR for joint stock prepositioning for ongoing operations and emergency response. Use of model requires validation of input data. We develop and discuss methods, such as scenario planning, for predicting the highly variable emergency demand related to refugees and internally displaced persons.

### 065-0655 Volunteer Management in Charity Storehouses

Maria Besiou, Associate Professor, Kuehne Logistics University, Germany  
Alfonso Pedraza-Martinez, Assistant Professor, Indiana University, United States

We study volunteer management at a large faith-based organization. We focus our study on the preparation of beneficiaries’ orders by volunteers in a storehouse. The volunteers’ arrival in the system and their skills are uncertain. Using empirical data, we explore the drivers of on-time order fulfillment at the storehouse level.

### 065-1461 Towards Sector-Wide Supply Chain KPIs

Sander De Leeuw, Associate Professor, Vrije Universiteit Amsterdam, Netherlands

Unfortunately, when metrics are used in humanitarian organizations, they are often ill defined and poorly designed, resulting in unintended behaviors and an inability to empirically demonstrate any improvements from a baseline. We report on the progress of a USAID funded project towards common supply chain KPIs for the humanitarian sector.

### 065-0409 Roles of Humanitarian Actors in the Humanitarian Supply Chain

Hella Abidi, Lecturer, Nottingham Trent University, United Kingdom  
Leif-Magnus Jensen, Assistant Professor, Jönköping Business School, Sweden  
Matthias Klumpp, Professor, FOM Ild, Germany

The purpose of this research is to take initial steps towards creating a framework for classifying the roles of different humanitarian actors in the humanitarian supply chains during relief operations.

### 065-0666 Leading Diverse Groups in the Humanitarian Field Offices

Louisa Meyer, Student, Kuehne Logistics University, Germany  
Maria Besiou, Associate Professor, Kuehne Logistics University, Germany  
Niels Van Waackeke, Professor, Kuehne Logistics University, Germany  
Mohajer Salem, Student, Kuehne Logistics University, Germany

The humanitarian system struggles with inadequate operational leadership. We study the role of leadership regarding the relationship and tensions between expatriates and local staff in the same field office, and how the operational performance can be improved. The problem is approached using an online survey with 123 humanitarian practitioners.

### 065-0448 Applying Machine Learning to Revenue Management at Groupon

Wang Chi Cheung, Student, Massachusetts Institute of Technology, United States  
David Simchi-Levi, Professor, Massachusetts Institute of Technology, United States  
He Wang, Student, Massachusetts Institute of Technology, United States

We propose a data-driven pricing algorithm for retailers that learns customer demand from real-time sales data. Our method first generates multiple demand functions, and then learns on the fly which demand function is correct. We also discuss some field experiment results through collaborating with Groupon, a large daily deals website.

### 065-0451 Choosing an Assortment Rotation Strategy to Boost Sales

Kris Ferreira, Assistant Professor, Harvard University, United States  
David Simchi-Levi, Professor, Massachusetts Institute of Technology, United States

By offering products sequentially as opposed to simultaneously, fashion retailers can introduce uncertainty in consumer choice that affects purchase decisions; consumers must decide whether to purchase an item before seeing items offered next period. We develop a consumer choice model and study when this uncertainty is advantageous for a retailer.

### 065-1019 Optimizing Customer Pickup Locations Using an Empirical Model

Chloe Kim, Student, University of Pennsylvania, United States  
Marshall Fisher, Professor, University of Pennsylvania, United States  
Xuanming Su, University of Pennsylvania, United States

We empirically study the determinants of pickup location success for an online grocery retailer. We consider various aspects of individual locations, including local competition, local consumer attributes, and the potential for cannibalizing sales from other locations. We suggest an algorithm for optimizing pickup locations and measure its impact on revenue.

### 065-1429 Reaping the Benefits of Bundling in the Presence of High Production Costs
### Session: Strategies for Improving Scheduling in Hospitals  
**Chair(s):** Vikram Tiwari  
**Track:** Healthcare Operations Management

**Chair(s):** Vikram Tiwari  
**Track:** Healthcare Operations Management

**Title:** Scheduling Physicians to Minimize Patients' Wait Time  
**Authors:** Nadia Lahrichi, Assistant Professor, Ecole Polytechnique, Canada  
Nazarl Niroumandrad, Student, Ecole Polytechnique, Canada

Each phase of radiotherapy care process consists of several stages. We are proposing a weekly cyclic scheme of physicians to shorten the pre-treatment phase considering uncertainty related to patients' arrival and profiles. A Tabu Search algorithm is proposed and validated through comparison with CPLEX.

**Title:** Scheduling Appointments to Meet Access Delay Service Level for Surgery at the Mayo Clinic  
**Authors:** Poooyan Kazemian, Student, University of Michigan Ann Arbor, United States  
Kalyan Pasupathy, Assistant Professor, Mayo Clinic, United States  
Mustafa Sir, Assistant Professor of Healthcare Systems Engineering, Mayo Clinic, United States  
Mark van Oyen, Professor, University of Michigan Ann Arbor, United States

We use OR methods to schedule surgical appointments in colon and rectal surgery at the Mayo Clinic. A clinic appointment and a tentative surgery date are scheduled for each patient in order to provide surgery by their target date, while also considering the efficient use of limited resources.

**Title:** Scheduling Operating Rooms with Elective and Emergent Surgeries  
**Authors:** Kyung Sung Jung, Lecturer, University of Florida, United States  
Michael Pinedo, Professor, New York University, United States  
Chelliah Sriskandarajah, Professor, Texas A&M University College Station, United States

We adopt and refine techniques from the mechanism design literature to give improved revenue bounds for simple bundling strategies that hold for arbitrary demand distributions. Using this, we can provide concrete pricing schemes for retailers that capture the benefits of bundling even when individual items have high production costs.
Operating rooms (ORs) generate the greatest revenue for hospitals, and are the largest cost centers. Due to the uncertainties of emergent patient arrivals, scheduling ORs is a challenging task. We develop an aggregate model which deals with block schedules of elective patients, considering the random arrivals of emergency patients.

**065-1607**  Replacing Waitlists with Windows: Increasing Patient Satisfaction with Elective Surgery Booking
Sherry Weaver, Lecturer, University of Calgary, Canada
Michael Carter, Professor, University of Toronto, Canada

Accurate prediction of surgical waits impacts elective arthroplasty booking practices. We present a Markov process modeling patient progression from consult to surgery. This model computes a surgical window that, for a given prediction level (P), can guarantee that the patient will have his or her surgery within the window, P% of the time.

---

**222**
Saturday, 09:45 AM - 11:15 AM, Salon 8
Session: Allocation and Routing Decisions in Health Care
Track: Healthcare Operations Management
Chair(s): Pinar Keskinocak

**065-0400**  Home Care Routing and Appointment Scheduling with Stochastic Service Durations
Yang Zhan, Student, Shanghai Jiao Tong University, China
Zizhuo Wang, Assistant Professor, University of Minnesota, United States
Guohua Wan, Professor, Shanghai Jiao Tong University, China

We consider an integrated route and appointment scheduling problem arising in home healthcare. Given a set of patients with known locations and service duration distributions, the team is required to visit each location exactly once to minimize the total costs. We develop exact and heuristic algorithms to solve the problem.

**065-0810**  Effective Category Management for Collection and Distribution of Cord Blood
Katarina Nordstrom, Professor, Aalto University, Finland
Ari Vepsalainen, Professor, Aalto University, Finland
Katariina Kemppainen, Professor, Aalto University, Finland

Cord blood is a safe and valuable source of cells for use in clinical applications. We examine the end-to-end process involving cord blood donation, collection, and distribution in the public health care. The value of cord blood supply allocation is compared to bone marrow-derived cells and best practices.

**065-0901**  Identification and Allocation of Increased-Risk Encephalitis (IRE) Organs
Nishi Anand, Student, Georgia Institute of Technology, United States
Pinar Keskinocak, Professor, Georgia Institute of Technology, United States

We present two decision-support tools: 1) An Infectious Encephalitis Risk Calculator that predicts the risk of infectious encephalitis in donors with 22% higher accuracy compared to current practices; 2) A Liver Transplant Decision Aid with customized waiting-time estimates that helps evaluate trade-offs between accepting/rejecting IRE livers, enabling fewer wait-list deaths and better organ allocation.

---

**223**
Saturday, 09:45 AM - 11:15 AM, Crystal
Session: Pricing, Service, and Operations
Track: Service Operations
Chair(s): Ruxian Wang  Shiiliang Cui

**065-0389**  Optimal Pricing in Social Networks under Asymmetric Information
Yang Zhang, Assistant Professor, Tsinghua University, China
Ying-Ju Chen, Associate Professor, Hong Kong University of Science & Tech, Hong Kong

We study the optimal pricing in social networks where customers are strategic. Consumers know about their local networks while the selling firm only has knowledge of global network. We characterize the optimal menu contingent on the network structure, and discuss special cases with random network and scale-free network.

**065-0928**  Competing with a Responsive Follower: Copycat and Strategic Consumers
Mike Wei, Assistant Professor, University of Buffalo, United States

In this work, we study the production and pricing decisions of a market leader under strategic consumer behavior with possible network externality.

**065-0390**  Price and Quality Management for Products and Associated Services
Ruxian Wang, Johns Hopkins University, United States
Shiliang Cui, Assistant Professor, Georgetown University, United States

We investigate price and quality management for main products and associated services in various scenarios. Our findings suggest that the associated services can significantly improve firms' profitability as well as consumers' surplus.

---

**224**
Saturday, 09:45 AM - 11:15 AM, Lanai
Session: Optimization and Learning in Retail Operations
Track: Retail Operations Management
Chair(s): Dorothee Honhon  Xiajun Pan

**065-0172**  Learning Customer Preferences in Online Retail
Dorothee Honhon, Associate Professor, University of Texas Dallas, United States
Bharadwaj Kadiyala, Student, University of Texas Dallas, United States
Canan Ulu, Assistant Professor, Georgetown University, United States

Online retailers can use their assortments to learn about customer preferences through sales and clickstream data. We show that it may be optimal to display products on the search results page but not make some of these products available for purchase. We also quantify the benefits of gathering clickstream data.
Identifying Resource Dependencies in Large Media-Investor Networks with Graph-Based Algorithms

Oliver Eulenstein, Professor, Iowa State University, United States
Sabine Baumann, Professor, Jade Hochschule, Germany
Fabian Runge, Student, Jade University of Applied Sciences, Germany

Necessary, we examine the probabilistic selling strategy for vertically differentiated products. Our results show that probabilistic selling is never optimal for any level of supply when consumers are rational. When consumers’ valuations are distorted by salience, the seller can manipulate consumers’ attention and improve the profit by providing probabilistic products.

Dynamic Pricing and Learning with Online Retail Rankings

Andreas Holzapfel, Student, Catholic University of Eichstaett-Ingolstadt, Germany
Stefan Minner, Professor, Technische Universitat Munchen, Germany

Assignment of Products to Alternative Distribution Centers in Retail Logistics Networks

Bora Keskin, Assistant Professor, Carleton University, Canada

Planning Product-Delivery Modes for Grocery Retail Stores

Beforehand, in online market environments such as Amazon or Google Shopping, firms receive advertisement space if they satisfy certain conditions. Beforehand, it is not clear if the benefits of this increased exposure outweigh the potential costs. We investigate this question in a dynamic pricing-and-learning setting.

Data-Driven Assignment of Retail Delivery Patterns with Handling Effort Considerations

Florian Taube, Student, Technische Universitat Munchen, Germany
Stefan Minner, Professor, Technische Universitat Munchen, Germany

Assignment of Products to Alternative Distribution Centers in Retail Logistics Networks

We examine the problem of assigning SKUs to alternative distribution centers, for example local, regional or centralized. We present an approach that reflects the interdependencies between inbound and outbound transportation, inventory management, picking and instore logistics while minimizing total logistics costs.

Optimizing Retail Display Space Allocation

Joseph Xu, Student, University of Pennsylvania, United States

We investigate the use of prominent display space as a non-price mechanism to improve retailer profit. We consider the effect of product display on both sales and supply chain costs and provide recommendations for optimizing display space allocation.

We examine the problem of assigning SKUs to alternative distribution centers, for example local, regional or central. We present an approach that reflects the interdependencies between inbound and outbound transportation, inventory management, picking and instore logistics while minimizing total logistics costs.

Probabilistic Selling for Vertically Differentiated Products: The Role of Salience

Quan Zheng, Student, University of Florida, United States
Xiajun Pan, Assistant Professor, University of Florida, United States
Janice Carrillo, Associate Professor, University of Florida, United States

Planning Product-Delivery Modes for Grocery Retail Stores

Food retailers have to deal with a complex distribution network with multiple distribution centers and different temperature requirements. We investigate the trade-off between consolidating a range of products in order to make direct-shipment to stores versus performing multiple delivery routes for products with different transportation requirements.

Effective Design of Backroom Storage Facilities in Retail Food Stores

Maria Pires, Student, Faculty of Engineering of University of Porto, Portugal
Pedro Amorim, Professor, Faculty of Engineering of University of Porto, Portugal
Paulo Sousa, Consultant, LTPlabs, Portugal
Bernardo Almada-Lobo, Associate Professor, Faculty of Engineering of University of Porto and INESC TEC, Portugal

Backrooms are crucial in modern retail stores and face great challenges. Despite having similar functions to conventional warehouses, backrooms have particularities that deserve a distinct analysis. We present a framework for designing these areas and a mathematical model for dimensioning backroom departments that minimizes construction, material-handling, storage, and out-of-stock costs.

Optimizing Retail Display Space Allocation

Youran Fu, Student, The Wharton School, United States

We investigate the use of prominent display space as a non-price mechanism to improve retailer profit. We consider the effect of product display on both sales and supply chain costs and provide recommendations for optimizing display space allocation.

Optimizing Retail Display Space Allocation

Joseph Xu, Student, University of Pennsylvania, United States

We investigate the use of prominent display space as a non-price mechanism to improve retailer profit. We consider the effect of product display on both sales and supply chain costs and provide recommendations for optimizing display space allocation.

Optimizing Retail Display Space Allocation

Youran Fu, Student, The Wharton School, United States
Joseph Xu, Student, University of Pennsylvania, United States

We investigate the use of prominent display space as a non-price mechanism to improve retailer profit. We consider the effect of product display on both sales and supply chain costs and provide recommendations for optimizing display space allocation.
Media companies need sufficient data about their industry and potential investors to access financial capital. Analyzing large media investor-networks is often limited due to small data sets or corrupted data. We focus on the identification of key actors and resource dependencies within a large media-investor network.

This literature review investigates the extent of and trends in theory development in empirical quantitative literature in the domain of manufacturing strategy. Articles are categorized as reporters, testers, qualifers, builders, and expanders; and analyzed both in terms of theory building and theory testing. Future research directions are provided.

---

**065-0408**  
Theoretical Developments in the Manufacturing Strategy Literature  
Kamran Chattha, Associate Professor, Lahore University of Management Sciences, Pakistan  
Irfan Butt, Associate Professor, Sultan Qaboos University, Oman  
Mamoona Arshad, Student, Lahore University of Management Sciences, Pakistan  
Muhammad Shakeel Sadiq Jajja, Student, Lahore University of Management Sciences, Pakistan

---

**065-0495**  
A City with a Fully Coordinated Vehicle Sharing System  
Monirehalsadat Mahmoudi, Student, Arizona State University Tempe, United States  
Xuesong Zhou, Associate Professor, Arizona State University Tempe, United States

We propose a new time-discretized-multi-commodity network flow model by introducing the concept of ride-sharing. The model is applied to the pickup and delivery problem with time-windows based on the integration of vehicles' carrying-states within space-time transportation networks. We present a holistic optimization approach to synchronize travel-activity schedules and transportation services in urban networks.

---

**065-1914**  
High Speed Rail: "Link" to the Future!  
Raj Selladurai, Associate Professor, Indiana University, United States

In view of California's developments with high speed rail the question arises whether high speed rail is a viable option in Midwestern states. Need, impact, benefits of high speed rail, and ongoing research studies will be presented.

---

**065-1885**  
Iterative Mechanisms for Shippers' Collaboration in Production-Shipping Planning  
Minhui Lai, Assistant Professor, Southeast University, China  
Xiaoqiang Cai, Professor, Chinese Univ of Hong Kong, Hong Kong

We study the collaborative distribution problem of the shippers with sensitive private information. We propose iterative mechanisms that are convergent, strategy proof, individually rational, and budget balanced in most cases. The mechanisms are implemented by efficiently computable distributive algorithms. Extensive simulations show that the mechanisms quickly and efficiently converge.

---

**065-1126**  
Enhance Infrastructure Sustainability by Agile Disruption Recovery Plan  
Gang Li, Assistant Professor, Bentley University, United States  
Xiangtong Qi, Associate Professor, Hong Kong University of Science & Tech, Hong Kong

We develop decision models and algorithms to assist in the quick and cost effective recovery of infrastructure from unexpected disruptions. Our work helps enhance an organization's operational sustainability by developing the optimal resource allocation plan under emergencies.

---

**065-0082**  
Emerging Trends and Future Directions for Empirical OM Research  
Kenneth Boyer, Professor, Ohio State University, United States  
Craig Froehle, Professor, University of Cincinnati, United States  
Ujwal Mukherjee, Assistant Professor, University of Illinois Urbana-Champaign, United States  
Enno Siemons, Professor, University of Wisconsin Madison, United States  
Kaitlin Wowak, Assistant Professor, University of Notre Dame, United States

This panel will focus on emerging trends and future directions for empirical operations management research. The session will begin by each of the speakers providing an overview of emerging research opportunities - both research topics and empirical methods - and then we will open it up to the audience.

---

**065-0992**  
Critical Chain Project Scheduling Problem in DTRTP Environment  
Binghua Ren, student, School of Management, China  
Nanfang Cui, Professor, School of Management, China  
Wendi Tian, Doctor, School of Management, Wuhan Textile University, China

There are various optimal execution modes with the same minimum project duration in the DTRTP. We analyzed the impact of different optimal execution modes on the critical chain scheduling. Two filtering indexes, including total duration and resource tightness, were proposed to select the optimal execution modes that would yield improved project performance.

---

**065-0151**  
The Calculation of Buffer Size Considering Activity Schedule Risk  
Nanfang Cui, Professor, Huazhong University of Science & Technology, China  
Jinying Hao, Student, Huazhong University of Science & Technology, China
A new method is proposed to calculate the buffer size based on the activity schedule risk. Compared with Root Square Error (RES), the simulation experiments indicate that this method gets approximate robust performance with smaller buffer and avoids the critical chain rupture and non-critical chain overflow to a certain extent.

065-0766 Resource-Constrained Project Scheduling using Microsoft Excel's Evolutionary Solver
Mario Gnagi, Student, Department of Business Administration, Switzerland
Norbert Trautmann, Professor, Department of Business Administration, Switzerland

We analyze how the evolutionary solver contained in Microsoft Excel's Solver Add-in can be applied to the resource-constrained project scheduling problem (RCPSP). We present an implementation of the serial schedule-generation scheme in a spreadsheet, which combined with the evolutionary solver can be used for devising good feasible schedules.

Saturday, 09:45 AM - 11:15 AM

230
Session: Advances in Dynamic Pricing of Consumer Goods
Chair(s): Candace Yano

065-0318 Pricing and Inventory Control for Multiple Substitutable Products
Kevin Li, Student, University of California Berkeley, United States
Candace Yano, Professor, University of California Berkeley, United States

We consider a retailer's problem of setting prices and inventory levels for multiple substitutable products. Our model includes promotional prices, product substitution, multiple periods, and strategic consumers (stockpiling and reference price effects). We present structural results and numerical examples that provide insight into the structure of optimal policies.

065-0555 Integrating Dynamic Inventory and Pricing Decisions under Lost Sales
Qi Peng, Professor, Purdue University, United States
Sirong Luo, Associate Professor, Shanghai University of Finance and Economics, China
George Shankhikumar, Professor, Purdue University, United States

Inventory-based pricing decision under lost sales is challenging due to the non-concave objective and the existing developments are restricted to special demands for either single-period or long-term stationary models. We show that the general problem reveals nice structural property when restricting the price to be decreasing in inventory.

065-0566 Efficient Algorithms for Dynamic Pricing Problem with Reference Price Effect
Zhenyu Hu, Assistant Professor, National University of Singapore, Singapore
Peng Hu, Assistant Professor, Huazhong University of Science & Technology, China
Xin Chen, Professor, University of Illinois Urbana-Champaign, United States

We develop efficient algorithms for the dynamic pricing problem in which demand depends on not only the current price but also past prices through reference prices. We then use our algorithms to study the optimal price path and the value of dynamic pricing when demands are seasonal.

065-1134 When Do Bidders Regret During Auctions? Empirical Evidence from eBay
Meisam Hejazi Nia, Student, University of Texas Dallas, United States
Ozalp Ozer, Professor, University of Texas Dallas, United States
A. Serdar Simsek, Assistant Professor, Jindal School of Management, United States

We developed a structural model that accounts for bidders' learning and their anticipation of winner and loser regrets in auctions. Using a large data set from eBay, we quantify the product categories in which bidders anticipate regret and show how our results can be used to increase eBay's revenue significantly.

231
Session: Market Systems in Power Networks
Chair(s): Ermin Wei Chaithanya Bandi

065-0583 Multi-Period Optimal Power Flow Under Heat and Water Constraints
Dariush Fooladivanda, Student, University of Toronto, Canada
Joshua Taylor, Assistant Professor, University of Toronto, Canada

Climate change has exposed the vulnerability of power utilities to low water availability and water temperatures. We focus on a geographical area whose power system is controlled by an operator that relies on a set of power plants, and study the impact of water availability and temperature on electricity generation.

065-1088 A Market Mechanism for Electric Distribution Networks
Na Li, Assistant Professor, Harvard University, United States

Externalities associated with voltage capacity constraints and line losses constitute a significant barrier to forming an efficient electricity market. We present a market mechanism to internalize these external effects within private decisions by defining trading rules. We also look at means of incentivizing end-users to participate in a smart grid system.

065-1091 Efficiency of Supply Function Equilibrium in Networked Electricity Markets
Ermin Wei, Assistant Professor, Northwestern University, United States
Chaithanya Bandi, Assistant Professor, Northwestern University, United States
Yuanzhang Xiao, Student, Northwestern University, United States

Motivated by the deregulation of electricity markets, we study the efficiency loss of the supply function equilibrium (SFE) with inelastic demand, a uniform market clearing price, and network flow capacity limits (modeling physical network constraints). We study how network topology affects the efficiency of SFE.

065-1684 Efficiency and Effectiveness of Emission Regulation in the EU Automobile Market
Kejia Hu, Student, Northwestern University Kellogg School o, United States
Yuche Chen, Research Scientist, National Renewable Energy Laboratory, United States

Motivated by the deregulation of electricity markets, we study the efficiency loss of the supply function equilibrium (SFE) with inelastic demand, a uniform market clearing price, and network flow capacity limits (modeling physical network constraints). We study how network topology affects the efficiency of SFE.
We study the efficiency and effectiveness of EU emission regulations on automobile emissions and examine vehicle attribute trade-offs.

---

**233**
*Saturday, 09:45 AM - 11:15 AM, Lily*
**Session:** Procurement in Agriculture  
**Chair(s):** Shahryar Gheibi

**065-1844** Socially Responsible Purchasing and Supply Chain Performance in the Food and Beverage Industry  
Titilayo Ogungyemi, Student, Brunel University, United Kingdom  
Angela Ayios, Lecturer, Brunel University, United Kingdom  
Virginia Spiegler, Lecturer, Brunel University, United Kingdom

Companies have policy for including social aspects in purchasing; however, it is believed that some barriers would hinder this and that it does not have impact on supply chain performance. This paper identifies socially responsible purchasing practices, the main drivers and barriers facing the implementation efforts and relation to performance.

---

**065-0412** Outsourcing Decision Support for an Indian Coal Mining Organization  
Mousumi Modak, Student, Indian Institute of Technology Kharagpur, India  
Ashutosh Sarkar, Associate Professor, Indian Institute of Management Kozhikode, India  
Khanindra Pathak, Professor, Indian Institute of Technology Kharagpur, India  
Kunal Ghosh, Assistant Professor, Indian Institute of Technology Kharagpur, India

This article presents competency based framework for strategic outsourcing decision support based on the concept of value chain analysis for an Indian coal mining organization. This approach enables managers towards outsourcing of activities that utilize tangible resources. Outsourcing guidelines for activities that primarily involves intangible resources have also been suggested.

---

**234**
*Saturday, 09:45 AM - 11:15 AM, Magnolia*
**Session:** Sharing Economy and Operations  
**Chair(s):** Zhichao Zheng

**065-0647** Collaborative Consumption: Strategic and Economic Implications of Product Sharing  
Baojun Jiang, Assistant Professor, Washington University St Louis, United States  
Lin Tian, Student, Fudan University, China

We examine the strategic and economic impacts of collaborative consumption-product sharing among consumers. Our analysis shows that friction in the product-sharing market may have non-monotonic effects on the firm's profits, consumer surplus, and social welfare. Product sharing among consumers can be win-win or lose-lose for the firm and consumers.

---

**065-1155** We Are on the Way: Analysis of On-Demand Booking Systems  
Guoyun Feng, Student, University of Minnesota, United States  
Guangwen Kong, Assistant Professor, University of Minnesota, United States  
Zizhuo Wang, University of Minnesota, United States

On-demand platforms such as Uber allow passengers with smartphones to submit trip requests and match them to drivers based on their locations and drivers’ availability. We build a model to analyze the efficiency of such on-demand systems and compare it to systems where people hail taxis on streets.

---

**065-1232** Coordination Mechanisms for On-Demand Staffing with a Self-Scheduling Workforce  
Tao Lu, Student, Hong Kong University of Science & Tech, China  
Zhichao Zheng, Assistant Professor, Singapore Management University, Singapore  
Yuanguang Zhong, Assistant Professor, South China University of Technology, China

We study the on-demand economy and its impact on labor market efficiency. We consider employers with uncertain demands, and a platform operator providing on-demand staffing service. We propose a fill rate-based allocation policy and incentive contracts to efficiently coordinate the system and induce the system-wide optimality in decentralized systems.

---

**065-1661** Outsourcing Tasks Online: Matching Supply and Demand on Peer-To-Peer Internet Platforms  
Zoe Cullen, Student, Stanford University, United States  
Chiali Farronato, Assistant Professor, Harvard University, United States

We study a central problem for peer-to-peer markets: how to create matches when demand and supply are highly variable. We model a matching market for services, and estimate it using data from TaskRabbit. We find that supply is highly elastic and explore heterogeneity of platform success across cities.

---

**235**
*Saturday, 09:45 AM - 11:15 AM, Orange Blossom*
**Session:** Technology Investments and Diffusion  
**Chair(s):** Cheryl Druehl  
Ayhan Aydin

**065-0705** Effects of Consumer Demand, Profitability, and Riskiness of a Core Technology on Upstream Investments  
Ayhan Aydin, Assistant Professor, School of Business, United States

We investigate the equilibrium investments in a technology by competing upstream firms in a supply chain, considering consumer demand, profitability, and the riskiness of the R&D process related to the technology. Seemingly positive factors are shown to negatively influence equilibrium investments and vertical diffusion.

---

**065-0728** How Much to Share: Information Sharing in Information Systems Security  
Yueran Zhuo, Student, University of Massachusetts Amherst, United States  
Senay Solak, Assistant Professor, University of Massachusetts Amherst, United States
Investment in technology and information sharing with other firms are critical components of a firm’s information security strategy. We model the interplay between these two decisions and identify policies defining optimal technology investments and information sharing levels. We also present results on the value of sharing security information across industries.

**065-1462 Dynamic Product Development and Optimal Launch for a Network of Customers**
Nur Sunar, Assistant Professor, University of North Carolina Chapel Hill, United States
John Birge, Professor, University of Chicago, United States
Sinit Vitavasiri, Business Analyst, Ericsson, United States

The development and launch of products with network externalities requires a deep understanding of social/commercial relationships among customers. Using a continuous time Brownian model, we explicitly solve for the optimal dynamic product development, launch, and post-launch strategies of a firm that sells an indivisible product to a network of customers.

**065-0927 Safety Issues and Behavioral Operations in Shipping**
Adrian Choo, George State University, United States
Yusen Xia, George State University, United States

We examine how workplace safety may affect behavioral operations in marine vessels that transport commercial goods in China. We will present results that show how workplace safety can affect proactivity in operations by demonstrating the importance of leaders “walking their talk.”

**065-1679 Emissions and Emerging Market Presence: An Empirical Study of Global Firms**
Yan Dong, Assistant Professor, University of South Carolina, United States
Deepa Wani, Student, University of South Carolina, United States
Kefeng Xu, Associate Professor, University of Texas San Antonio, United States
Manoj Malhotra, Professor, University of South Carolina, United States

Firms move to emerging markets to sell products and to outsource production. They may also take advantage of loose regulations in environmental protection in these countries. We empirically investigate the relationship between a firm’s presence in emerging markets and its emission levels and discuss ways to ameliorate these effects.

**065-1537 Sex and the Operations Manager**
Richard Metters, Professor, Texas A&M University College Station, United States

Some types of labor are considered women’s work in certain cultures. OM decisions can be affected by combining nearly all-female work forces with other cultural taboos. Facility location, layout, shift scheduling, TQM implementation and other operational decisions are different due to this cultural phenomenon.

**065-0162 Consumer Unions: Blessing Or Curse?**
C. Gizem Korpeoglu, Assistant Professor, University College London, United Kingdom

We study whether cooperation among consumers is beneficial to consumers when producers have market power. We establish that consumer welfare decreases with union size when the union size is above a certain threshold. We also prove that consumer unions discourage producers’ investments, which may have repercussions for long-term consumer welfare.

**065-0598 Should Consumers Be Strategic?**
Arian Afkali, Student, Duke University Durham, United States
Phinya Feldman, Assistant Professor, University of California Berkeley, United States
Robert Swinney, Associate Professor, Duke University Durham, United States

We consider whether strategic consumer behavior benefits consumers when they purchase from a rational, revenue-maximizing firm that sets prices over multiple periods. We show that strategic behavior does not benefit all consumers, and hence consumers may rationally “choose” not to be strategic.

**065-1010 Pricing and Prioritization in a Duopoly with Self-Selecting, Heterogeneous, Time-Sensitive Customers**
Arvind Sainathan, Nanyang Technological University, Singapore

Service providers prioritize their customers to enable time-based customer differentiation in several service operations contexts. However, what happens when service providers compete among self-selecting customers? Would they still prioritize? How would that perform? We investigate these questions by analyzing a three-stage game: service mode game, pricing game, and consumers’ game.

**065-1190 Information Cascade: Strategic Buying Under Information Uncertainty**
Mike Wei, Assistant Professor, University of Buffalo, United States
Michelle Xiao Wu, Assistant Professor, Washington State University Pullman, United States

We study a fashion retailer’s pricing strategy and strategic consumers’ optimal purchasing timing decisions under a quality uncertainty.

**065-1361 Agricultural Cooperative Pricing of Premium Products**
Nur Cavadoglu, Assistant Professor, Kadir Has University, Turkey
Burak Kazaz, Associate Professor, Syracuse University, United States
Scott Webster, Professor, Arizona State University Tempe, United States

We find that farmers tend to underinvest in quality under the current policy used by a cooperative when purchasing a premium product from member farmers. We propose and analyze an alternative policy that benefits both the member farmers and the cooperative.
### 238 Saturday, 09:45 AM - 11:15 AM, Quince
**Session:** Innovations in Teaching Simulations and Case Studies I  
**Track:** Teaching/Pedagogy in P/OM  
**Chair(s):** Larry Taube

**065-1380** Data-Driven Decision Making in a Core Operations Management Course  
Debra Bishop, Associate Professor, Drake University, United States  
Brad Meyer, Drake University, United States

What does big data mean for the teaching of operations management? Is it time to rethink the value of quantitative concepts in a core POM class? As part of our college's new data analytics mission we share our redesigned core operations management course focusing on data-driven decision making.

**065-1071** Preparing Leaders to Live in a Virtual World: A Template to Enhance Effectiveness of Various Online Global Supply Chain Simulations  
Doug Parkes, Lecturer, University of North Carolina Greensboro, United States  
Larry Taube, Associate Professor, University of North Carolina Greensboro, United States  
Chuck Nemer, CONSULTANT AND EDUCATOR, THEBIZGURU.COM, United States

We provide insight into the practical use of two commercially available Business Simulations in a Virtual Learning Environment. We show a template and "Road Map" (course design elements) for demonstrating the importance of specific operational processes related to Supply Chain Management and the importance of communication.

**065-1094** Critical Thinking Learning Outcomes in Operations with an Interdisciplinary Approach  
Hulya Yazici, Associate Professor, Florida Gulf Coast University, United States  
Halcyon St.Hill, Professor, Florida Gulf Coast University, United States

We assess critical thinking learning outcomes using an interdisciplinary approach. Business, engineering and health professions students worked individually and as a team on a health operations case study. We used the AAC&U Critical Thinking Inventory rubric to assess students' critical thinking along with students' thinking and learning styles.

### 239 Saturday, 09:45 AM - 11:15 AM, Azalea
**Session:** Panel: Risk, Resilience, and Supply Chain Management - The Next Generation  
**Track:** Supply Chain Risk Management  
**Chair(s):** Steve Melnyk

**065-0501** Risk, Resilience, & Supply Chain Management - The Next Generation  
Steve Melnyk, Professor, Michigan State University, United States  
George Zsidisin, Professor, Virginia Commonwealth University, United States  
Christopher Zobel, Professor, R.B. Pamplin Professor of BIT, United States  
William Ritchie, Associate Professor, James Madison University, United States

This session brings together a panel of leading researchers in risk management and resilience to discuss the new developments that are shaping the future of this area. To be discussed are issues in methodology, cybersecurity, uncertainty, adjacency risk, and strategic risk. The implications for research are discussed.

### 240 Saturday, 09:45 AM - 11:15 AM, Begonia
**Session:** Supply Networks Analytics Mini Series 2  
**Track:** Supply Chain Analytics  
**Chair(s):** Jun Li

**065-1559** Resilient Supply Chain: A Two-Stage Robust Network Flow Perspective  
Peter Yun Zhang, Student, Massachusetts Institute of Technology, United States  
David Simchi-Levi, Professor, Massachusetts Institute of Technology, United States  
Nikolaos Trichakis, Assistant Professor, Harvard University, United States

We present a model that captures two sets of decisions a supply chain designer faces: placement of inventory in preparation for supply and demand uncertainty, and resource allocation after the uncertain events unfold. We show optimality and tractability results for network structures that arise naturally from manufacturing and healthcare systems.

**065-1828** Supply Chain Performance: The Effects of Flexible Inventory Controls on Total Supply Chain Costs  
Laird Burns, Assistant Professor, University of Alabama Huntsville, United States  
Fan Tseng, Professor, University of Alabama Huntsville, United States

We use a computational model to evaluate total supply chain costs, including production, inventory, and transportation costs, and customer delivery performance under conditions of supplier capacity constraints, with flexible inventory controls and periodic supplier feedback for problems of random and structured supply chain demand patterns.

**065-0153** Managing Upstream Supplier and Downstream Customer Networks to Drive Firm Performance: An Empirical Investigation  
Manpreet Hora, Associate Professor, Georgia Institute of Technology, United States  
Marcus Bellamy, Assistant Professor, Boston University, United States  
Soumen Ghosh, Professor, Georgia Institute of Technology, United States

We examine the relationship dependence and supply network structure of a firm's supply chain and its influence on firm performance. Using supply chain relationship data, we demonstrate that the supply network structure moderates the association between relationship dependence (upstream cost concentration and downstream revenue concentration) and firm performance.

**065-0821** Importing and the Likelihood of Disruptions  
Nitish Jain, Assistant Professor, London Business School, United Kingdom  
William Schmidt, Assistant Professor, Cornell University, United States

Research suggests that importing from foreign markets can benefit domestic firms, including gaining access to specialized skills and lower input prices. We empirically examine whether importing also impacts the likelihood that the firm is subject to an operational disruption compared to matched control firms that do not import.
**Session: Improved Spare Parts Inventory Management through Hybrid Sensing**

**Chair(s):** Ana Muriel

**Track:** Inventory Management

**065-2042** Robust Remaining Life Prediction of Aircraft Engines Based on Hybrid Sensing

Peng Wang, Student, Case Western Reserve University, United States
Robert Gao, Professor, Case Western Reserve University, United States

We present a systematic solution for machine remaining life prediction that provides inputs to inventory management. Under Bayesian inference framework, we propose a virtual sensing method to transfer physical sensor readings to quantities of interest, based on which performance degradation tracking is performed. The system evaluates engines in the aircraft industry.

**065-0917** An Inventory Model Using Real-Time Sensor Data to Predict Unplanned Maintenance

Michelle Park, PhD, RPI, United States
Jennifer Ryan, University of Nebraska Lincoln, United States

The system evaluates engines in the aircraft industry.
We consider spare parts inventory management when sensor data provides information about the status of a fleet of machines. The machines have a pre-specified maintenance schedule. Given observed sensor data, some machines require maintenance ahead of schedule. We develop an inventory model which incorporates both types of maintenance.

**065-2040  Fleet Maintenance Management Simulation**
Michael Prokle, Student, University of Massachusetts Amherst, United States
Ana Muriel, Associate Professor, University of Massachusetts Amherst, United States

We use the commercial jet engine industry to validate a framework for transforming sensor readings from units in the field into reliable forecasts and inventory policies for spare parts. We also identify the benefits of this framework through simulation of the management of an aircraft fleet.

**065-0898  Who Is Telling the Truth? A Comparison Study of Guest Surveys and Online Reviews**
Jie Zhang, , University of Vermont, United States
Rohit Verma, , Cornell University, United States

Service organizations have been conducting guest surveys to assess satisfaction and identify opportunities for future improvement. Online reviews present an increasingly popular channel for gathering feedback. We empirically investigate the commonalities and differences between these two forms of feedback loops.

**065-1023  Empirical Study on Destination Tourism Service Quality in Vietnam**
Anh Phan, Lecturer, Vietnam National University, Hanoi, Vietnam
Yoshiki Matsu, Professor, Yokohama National University, Japan

We empirically investigate the perception of service quality and customer satisfaction in Vietnamese destination tourism. Analyzing the data collected through questionnaire survey, this study highlights the significant similarities and differences in the perception of service quality between foreign and local visitors in term of core-tourism experience, Hospitality, Fairness of price, and Amenities.

**065-0693  Divergent Factors in the Relationship between the Main Suppliers of a Corporate Travel Agency**
Mark Tunu, Student, Universidade Municipal de São Caetano do Sul, Brazil
Milton Farina, Professor, Universidade Municipal de São Caetano do Sul, Brazil
Dias Alves, Student, Universidade Municipal de São Caetano do Sul, Brazil

Despite the non-formal recognition on the points that differ in the relationship between suppliers and a corporate travel agency, it was identified in this study that there is a discrepancy from the point of view between suppliers and from the point of view of corporate travel agency.

**065-1805  Productive Efficiency and Service Quality: A Study of the Indian Airline Industry**
Sajeet George, Associate Professor, S P Jain Inst. of Management & Research, India

We measure the productive efficiency and service quality of airlines operating in India. A Data Envelopment Analysis (DEA) methodology is used for the measurement of productive efficiency while SERVQUAL framework, Kano Model and Analytic Hierarchy Process are employed in the service quality analysis.

**065-0852  A Comparative Study of Online Review Management Strategies**
Ying Fan, Assistant Professor, University of Colorado Colorado Springs, United States
Run Niu, Assistant Professor, Webster University, United States

Managing online reviews has become a routine task of service managers as they increasingly recognize the impact of these reviews on customer purchasing decisions. Based on in-depth interviews conducted with service organizations in the US and China, we compare the online review management strategies between these two countries.

**065-0009  Leadership Effectiveness: Communication, Transparency, and Skin-In-The-Game**
Beatrice Boulu-Restef, Student, University of Virginia, United States
Jeremy Hutchison-Krupat, Assistant Professor, University of Virginia, United States

To effectively lead teams within an organization, leaders must do more than offer financial incentives. Leaders may contribute their own effort, offer guidance, and share varying levels of information. In this research, we study how a leader's active participation, communication style, and transparency of information impacts a team's performance.

**065-0041  Addressing the Challenge of Resource Allocation in a Nonprofit Service Delivery Organization**
Priyank Arora, Student, Georgia Institute of Technology, United States
Morvarid Rahmani, Assistant Professor, Georgia Institute of Technology, United States
Karthik Ramachandran, Associate Professor, Georgia Institute of Technology, United States
This paper studies optimal allocation of resources in a nonprofit organization (NPO), which aims to maximize overall utility delivered to its clients. Our analytical model is based on secondary data (demand characteristics and efforts exerted) collected from an NPO working towards empowerment of victims of domestic violence.

**065-1048 Free Riding In Team Projects: The Role of the Leadership Style**  
Morvarid Rahmani, Assistant Professor, Georgia Institute of Technology, United States  
Guillaume Roels, Associate Professor, University of California Los Angeles, United States  
Uday Karmarkar, Professor, University of California Los Angeles, United States  

In order to remain innovative in today's global market, firms are increasingly organizing work around teams. In this paper, we investigate the role of the leadership style (autocratic or democratic) on free-riding in teams and characterize which leadership style is the most efficient depending on the project characteristics.

**065-1338 Idea Generation and the Role of Feedback**  
Joel Wooten, Assistant Professor, University of South Carolina, United States  
Karl Ulrich, Professor, University of Pennsylvania, United States  

In many settings, ideas are generated over time and managers face decisions about if and how to provide in-process feedback about the quality. We use field experiments to examine the effect of feedback on idea generation and show individual-level differences between treatments.

**065-0197 How Perceptions of User Reviews Impact Competition under Partial Consumer Awareness**  
Pelin Pekgun, Assistant Professor, University of South Carolina, United States  
Michael Galbreth, Associate Professor, University of South Carolina, United States  
Bikram Ghosh, Associate Professor, University of Arizona, United States  

We analyze the interaction of user reviews and experience uncertainty, where negative and positive reviews may be weighted differently in a consumer’s assessment of the valence of the posted reviews. We find that the competitive impact of this unequal weighting may not be intuitive in terms of pricing and profits.

**065-0426 Selling Freemium Products to Loss Averse Consumers**  
Sajjad Najafi, Student, University of Toronto, Canada  
Andy Tsay, Associate Professor, Santa Clara University, United States  

We consider a firm selling two versions of a single product, a freemium for free and a premium at a regular price, to consumers who are loss-averse. We find that when consumers become slightly dissatisfied with the freemium, counterintuitively, they become more willing to purchase the premium.

**065-0704 Revenue Management under a Two-Sided Network Effect**  
Tinglong Dai, Assistant Professor, 1979, United States  
Ozge Sahin, Associate Professor, Johns Hopkins University, United States  

We study a service provider’s revenue management problem under a two-sided network effect. Our analysis provides insights into the optimal pricing and capacity planning strategy in this setting.

**065-1164 Policy and Product Launch Implications of Parallel Imports in Pharmaceutical Industry**  
Mehmet Altug, Assistant Professor, George Washington University, United States  
Ozge Sahin, Associate Professor, Johns Hopkins University, United States  

We consider a pharmaceutical manufacturer that is planning the timing of a pioneer drug launch in a foreign country in the presence of parallel imports. We find that the Generalized Nash-Bargaining problem leads to a unique equilibrium price and characterize the optimal launch time. We discuss various policy implications.
Disaster Cycle Management: Matching Supply and Demand for Social Support through Social Media
Lucy Yan, Assistant Professor, Indiana University, United States
Alfonso Pedraza-Martinez, Assistant Professor, Indiana University, United States
We use the case of hurricane Sandy in 2012 to study the match of social support supply provided by organizations and social support demand from social media users during the disaster cycle. We find a mismatch between supply and demand to support social support and provide discussions on alleviating the mismatch.

Facilitating Transportation Procurement for Food Aid Distribution: The Case of the World Food Program in Kenya
Feyza Sahinayazan, Student, McGill University, Canada
Marie-Eve Rancourt, Assistant Professor, Université Du Quebec A Montreal, Canada
Vedat Verter, Professor, McGill University, Canada
Ben Watkins, CEO and Co-Founder, Kimetrica, United States
In Africa, managing freight transportation is a costly and complex component of the WFP food aid supply chain due to issues such as poor infrastructure, security risks, and volatile markets. We develop econometric models to identify the determinants of transportation prices and to improve the WFP procurement process in Kenya.

Wisdom of Crowds: Forecasting Using Prediction Markets
Ruomeng Cui, Assistant Professor, Indiana University Bloomington, United States
Achal Bassamboo, Associate Professor, Northwestern University, United States
Antonio Moreno-Garcia, Assistant Professor, Northwestern University, United States
We study the efficiency of these markets in extracting information from participants. We show that the distribution forecasts, such as sales and commodity prices predictions, generated by the crowds are perfectly calibrated. In addition, we run a field experiment to study drivers of forecast accuracy.

Optimal Pricing and Overbooking of Reservations
Jaeleen Oh, Assistant Professor, University of Utah, United States
Xuanming Su, Associate Professor, University of Pennsylvania, United States
Customers who make reservations in advance are guaranteed service when they show up. We study how firms should charge for reservations and how many reservations they should accept.

Price Dispersion and Consumer Upgrades: Theory and Empirical Evidence from Airline Industry
Yao Cui, Assistant Professor, Cornell University, United States
Yesim Orhun, Assistant Professor, University of Michigan Ann Arbor, United States
Izak Duenyas, Professor, University of Michigan Ann Arbor, United States
We study how the offering of upgrade seating affects an airline’s ticket price dispersion. We provide insights into this effect though both analytical and empirical means.

Learning Quality of Manufacturers via Order Distribution
Chen Jin, Student, Northwestern University, United States
Laurens Debo, Associate Professor, Dartmouth College, United States
We study a market with many firms and manufacturers, where manufacturers have quality variations and this information is only known to some of the firms. Other firms that do not have this information infer the quality of firms by observing the current order quantities of each firm.

Our research extends Upper Echelons Theory and recall research by studying the impact of top executive experience on firm recall performance. We identify executives with operations management and supply chain management experience and theorize that SCOM experience in the top management team will impact recall frequency and responsiveness.

We study a supply chain with both quality improvement and customer returns. We analyze the retailer’s incentives for refund price and the supplier’s incentive for quality improvement. We also design coordinating contracts for the supply chain, which is influenced by several factors: profit negotiation, first-mover right, and information asymmetry.

Many models have been proposed to evaluate screening strategies for detecting cancer. Due to differing structures and assumptions, models may disagree about the most effective screening strategy. Using optimization, we identify screening strategies that are effective across multiple models, which could increase confidence in the quality of the identified strategies.

Mammography screening is the golden standard for breast cancer screening, but it is less accurate for women with dense breasts. Supplemental screening methods have been recently introduced to improve detection accuracy. We study the impact of supplemental tests by incorporating breast density information in a partially observable Markov decision process model.

Healthcare processes are complex activities that span organizational, spatial, and temporal boundaries. Systemic insights are consequently difficult to achieve. Our research develops a data-driven methodology, fusing systems modeling, data mining, and visualization, to identify, describe, and visualize healthcare processes. We illustrate our methodology with a case study in pediatric healthcare.
<table>
<thead>
<tr>
<th>Session</th>
<th>Track</th>
<th>Session Title</th>
<th>Chair(s)</th>
<th>Location</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>258</td>
<td>Healthcare Operations Management</td>
<td>Addressing Healthcare Costs via Analytics and Behavioral Approaches</td>
<td>Aline Avelar</td>
<td>Saturday, 01:30 PM - 03:00 PM, Salon 8</td>
<td></td>
</tr>
<tr>
<td>065-0482</td>
<td></td>
<td>Quantitative Methods Applied to Management Costs for Health Sector</td>
<td>Claudia Mattos, Assistant Professor, Centro Universitario Da Fei, Brazil, João Chang Junior, Associate Professor, Centro Universitario Da Fei, Brazil, Alfredo da Silva Fernandes, Professor, Universidade De Sao Paulo, Brazil</td>
<td>Saturday, 01:30 PM - 03:00 PM, Salon 8</td>
<td></td>
</tr>
<tr>
<td>065-1194</td>
<td></td>
<td>Process Improvement in Healthcare Using Analytics</td>
<td>Sanjeev Bordoloi, Associate Professor, University of St. Thomas, United States</td>
<td>Saturday, 01:30 PM - 03:00 PM, Salon 8</td>
<td></td>
</tr>
<tr>
<td>065-1557</td>
<td></td>
<td>Identifying Hospital Antimicrobial Resistance Targets Via Robust Ranking</td>
<td>J. Brooks, Associate Professor, Virginia Commonwealth University, United States, Jose Dula, Professor, Virginia Commonwealth University, United States, Aly Pakyz, Associate Professor, Virginia Commonwealth University, United States, Rorald Polk, Emeritus Professor, Virginia Commonwealth University, United States</td>
<td>Saturday, 01:30 PM - 03:00 PM, Salon 8</td>
<td></td>
</tr>
<tr>
<td>065-0858</td>
<td></td>
<td>Evolution of Private Health Services Costs in Brazil</td>
<td>Aline Avelar, Professor, Universidade De Sao Paulo, Brazil, Antonio Silva, Student, Universidade De Sao Paulo, Brazil, Claudia Angelo, Professor, University of Sao Paulo, Brazil, Nuno Fouto, Professor, University of Sao Paulo, Brazil, Jose Silveira, Professor, University of Sao Paulo, Brazil</td>
<td>Saturday, 01:30 PM - 03:00 PM, Salon 8</td>
<td></td>
</tr>
<tr>
<td>259</td>
<td>Behavior in Operations Management</td>
<td>Behavior and Product Development Decisions</td>
<td>Dina Ribbink</td>
<td>Saturday, 01:30 PM - 03:00 PM, Crystal</td>
<td></td>
</tr>
<tr>
<td>065-1176</td>
<td></td>
<td>Behavioral Analysis on the Use of an Intermediary in Manufacturing Outsourcing</td>
<td>Qiong Chen, Assistant Professor, University of Science &amp; Technology, China, Aleda Roth, Professor, Clemson University, United States, Gulru Ozkan-Seely, Assistant Professor, University of Washington Bothell, United States</td>
<td>Saturday, 01:30 PM - 03:00 PM, Salon 8</td>
<td></td>
</tr>
</tbody>
</table>
Fred Switzer, Professor, Clemson University, United States

In this paper, we examine how the level of outsourcing competence of the firm, the amount of time-to-market pressure and the buyer's perceived incentive alignment with the agent, act to systematically influence the decision to outsource the new product directly or indirectly through an intermediary.

065-0262 Production Process Moves and the Necessity to Change
Petits Kent, Student, University of Minnesota, United States
Enno Siemsen, Professor, University of Wisconsin Madison, United States

To study the growing trend of multinational firms moving production processes within and between countries to address strategy needs, we develop a behavioral experiment where production teams build small devices for multiple rounds, with “template use” and “environmental change” as the individual variables of interest, cost as the dependent variable.

065-0731 Coordination in New Product Development: An Experiment
Tingting Yan, Assistant Professor, Wayne State University, United States
Dina Ribbink, Assistant Professor, University of Western Ontario, Canada
Hubert Pun, Assistant Professor, University of Western Ontario, Canada

In New Product Development, the collaboration between buyer and supplier is becoming increasingly important. Using an experiment, we look at the contract parameters of buyer-supplier interactions in the presence of different types of risk.

260 Saturday, 01:30 PM - 03:00 PM, Lanai
Session: Studies in Behavioral Operations
Chair(s): Robert Batt

065-0108 Behavioral Inventory Sharing
Hui Zhao, Associate Professor, Penn State University University Park, United States
Enno Siemsen, Professor, University of Wisconsin Madison, United States

In a lab experiment, we examine order, supplemental request and sharing decisions in an inventory sharing context. Results from our experiment indicate that the transfer price between actors does not affect initial orders; further, the ability to share inventory does not benefit, but can hurt performance in the game.

065-0889 Performance Goals, Procedural Compliance, and Worker Personalities: A Behavioral Investigation
Brett Massimino, Cornell University, United States
James Hill, Ohio State University, United States
Elliot Bedylo, Professor, Ohio State University, United States

We examine human behaviors in an environment in which performance goals are assigned on one task, and individuals are request to voluntarily comply with another. We examine the interacting effects of performance goals and personality traits on compliance behaviors.

065-1495 Drivers of Pick Worker Productivity
Robert Batt, Assistant Professor, University of Wisconsin Madison, United States
Santiago Gallino, Assistant Professor, Dartmouth College, United States

We empirically examine an apparel order-fulfilment center and estimate the impact of factors such as bin density, worker congestion, and worker tenure on worker productivity.

261 Saturday, 01:30 PM - 03:00 PM, Veranda
Session: Retailing Service Optimization
Chair(s): Naren Agrawal Stephen Smith

065-0454 Repack Evaluation and Design for Retail Supply Chains
Naren Agrawal, Professor, Santa Clara University, United States
Stephen Smith, Professor, Santa Clara University, United States

We develop a newsvendor based model for evaluating the effectiveness of a set of prepacks in a retail supply chain. The steady state solution for replenishment optimization is obtained by linear programming. Alternative prepack design strategies are compared using typical retail supply chain parameters.

065-0508 Customer Latency and Conversion
Dayoung Kim, Student, Cornell University, United States
Vishal Gaur, Professor, Cornell University, United States

Using clickstream data from multiple companies we test whether customers' time-related information - latency, time stamps of entry to website and subsequent clicks, or time spent on a specific stage of purchase - can improve demand prediction accuracy.

065-0573 Increasing Sales by Managing Congestion in Self-Service Environments
Hyun Soek Lee, Student, University of North Carolina Chapel Hill, United States
Vishal Gaur, Professor, Cornell University, United States

We examine the impact of customer-induced congestion in fitting rooms on store performance. Using a field study, we demonstrate the Inverted-U relationship between fitting room traffic and sales and identify two mechanisms that drive this relationship. We then conduct two field experiments to overcome the negative effect of congestion.

065-0684 Estimating Fill Rate for a Stochastic Inventory System
Vidya Mani, Assistant Professor, Penn State University University Park, United States
Doug Thomas, Professor, Penn State University University Park, United States
Dennis Lin, Professor, Penn State University University Park, United States
Liang Peng, Professor, Georgia State University, United States
We propose an empirical and a bootstrap-calibrated likelihood method for constructing confidence intervals for fill rates. Our example is a single-stage base-stock inventory system with an unknown demand distribution. Using sales and inventory data from an office-supplies retail chain we show that the proposed methods are effective.

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Purchasing and Supply Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>262</td>
<td>Saturday, 01:30 PM - 03:00 PM, Rose</td>
</tr>
<tr>
<td>Chair(s):</td>
<td>Sachin Modi</td>
</tr>
</tbody>
</table>

Panel: Sourcing in the Analytics Driven Economy

- Sachin Modi, Associate Professor, Iowa State University, United States
- WC Benton, Professor, Ohio State University, United States
- Constantin Blome, Professor, University of Sussex, United Kingdom
- Ram Narasimhan, Professor, Michigan State University, United States
- Nada Sanders, Professor, Northeastern University, United States
- Srinivas Talluri, Professor, Michigan State University, United States
- Stephan Wagner, Professor, Swiss Federal Institute of Technology Zurich, Switzerland

Large volumes of supplier data presents opportunities for firms to make more informed sourcing decisions. This panel discussion is aimed at discussing the current state of research and exploring research opportunities related to “sourcing in the analytics driven economy” for operations and supply chain scholars.

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Scheduling and Logistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>263</td>
<td>Saturday, 01:30 PM - 03:00 PM, Edelweiss</td>
</tr>
<tr>
<td>Chair(s):</td>
<td>Chrysanthos Gounaris</td>
</tr>
</tbody>
</table>

Panel: Latest developments in transportation and logistics planning (II)

- Minfang Huang, Associate Professor, North China Electric Power University, China
- Xiangpei Hu, Professor, Dalian University of Technology, China

A frequent order-fulfillment problem online supermarkets face is order parcel decomposition. We present a new order fulfillment process for order consolidation delivery. A time-space network technique is adopted to construct order parcel flow and then parcel consolidation is established using a multi-commodity network flow model.

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Global Supply Chain Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>264</td>
<td>Saturday, 01:30 PM - 03:00 PM, Fuschia</td>
</tr>
<tr>
<td>Chair(s):</td>
<td>Tingliang Huang, Yufei Huang</td>
</tr>
</tbody>
</table>

Panel: New Models and Perspectives in Managing Supply Chains

- Kenan Arifoglu, , University College London, United Kingdom
- Prateek Raj, , School of Management, United Kingdom

We study licensing decision of a brand owning firm that sells its primary product to conspicuous customers who value the brand exclusivity, and also licenses its brand name to a licensing firm. We compare efficiency of fixed-fee, royalty and mixed contracts and also explore the role of licensing under competition.

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Licensing in Conspicuous Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-0102</td>
<td>Tuesday, 01:30 PM - 03:00 PM, Rose</td>
</tr>
<tr>
<td>Chair(s):</td>
<td>Sachin Modi</td>
</tr>
</tbody>
</table>

Panel: Licensing in conspicuous markets

- Retsef Levi, Professor, Massachusetts Institute of Technology, United States
- Somya Singhvi, Student, Massachusetts Institute of Technology, United States
- Stacy Springs, Senior Lecturer, Massachusetts Institute of Technology, United States
- Shannon Stewart, Senior Lecturer, Massachusetts Institute of Technology, United States
- Shujing Wang, Student, Massachusetts Institute of Technology, United States
- Yanchong Zheng, Assistant Professor, Massachusetts Institute of Technology, United States

We empirically and theoretically study how the structure of a farming supply chain impacts risks of economically motivated adulteration in agricultural products. We use farm-level data to show that a more dispersed farming supply chain is prone to higher risks. Our model further investigates the impacts of prices and inspection.

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: On Money-Back Guarantees in a Distribution Channel: Asymmetric Bargaining Power and Downstream Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-0768</td>
<td>Tuesday, 01:30 PM - 03:00 PM, Rose</td>
</tr>
<tr>
<td>Chair(s):</td>
<td>Yufei Huang, Assistant Professor, University of Bath, United Kingdom</td>
</tr>
</tbody>
</table>

Panel: On Money-Back Guarantees in a Distribution Channel: Asymmetric Bargaining Power and Downstream Competition

- Yanchong Zheng, Assistant Professor, Boston College, United States
- Ying-Ju Chen, Associate Professor, Hong Kong University of Science & Tech, Hong Kong
To understand why retailers adopt different Money-back Guarantees (MBG) choices in practice, we examine two competing retailers’ MBG decisions, who also simultaneously bargain for wholesale prices with a wholesaler in a distribution channel. We show that retailers’ asymmetric bargaining power may lead to asymmetric MBG choices.

065-0897  Should a Multinational Firm Place Part of Its Supply Chain in a Tax Haven? Strategies for Tax Arbitrage
Hung Do, Assistant Professor, University of Vermont, United States  
Masha Shunko, , Purdue University, United States  
Andy Tsay, , Santa Clara University, United States  

Our model and analysis demonstrate that the MNC’s preferences regarding the operating structures are not necessarily an obvious ordering based on the amount of risk and decision authority transferred to the division. We derive and analyze threshold values of the performance parameters that describe the main tradeoffs involved.

065-0858  Agent based computational economics and its application for IS Research
Karthik Kannan, Assistant Professor, Purdue University, United States  

Micro-motives of individual agents can have significant implications on macro-behaviors (Schelling, 1971). With computers increasing in sophistication, agent-based models to replicate such micro-motives for analysis in various contexts is becoming easier. Agent-based computational modeling is useful in obtaining insights into empirically observed behaviors, mechanism design, and for theory generation purposes.

065-1709  Bundling and Profit Bounds with Dependent Valuation
Mihai Banciu, Assistant Professor, Bucknell University, United States  
Fredrik Odgaard, Associate Professor, The University of Western Ontario, Canada  
Alia Stanciu, Assistant Professor, Bucknell University, United States  

We consider a seller providing a single bundle of n components. Valuation of the individual components by customers is not assumed independent but rather follows some dependence structure. The research objective is to establish pricing and profit bounds on the bundle given empirical transactional data.

065-0844  Why Revenue Management Is a Good Thing
Emmanuel Carrier, Business Consultant, Delta Airlines, United States  

As RM expands to more industries, it is becoming increasingly controversial with consumers. We examine a long series of airline empirical data to show that RM is a win-win strategy for producers and consumers. We discuss how to build upon this legacy given the emergence of "big data" techniques.

Wei Zhang, Assistant Professor, University of Hong Kong, China  
Sriram Dasu, Associate Professor, University of Southern California, United States  
Reza Ahmadi, Professor, University of California Los Angeles, United States  

Our empirical analysis of the sales data of a microprocessor company reveals that larger purchases do not always result in bigger discounts, which cannot be explained by existing theories. Our model shows that the non-monotonicity is rooted in how sellers value capacity and it has important implications for revenue management.

065-0067  An Analysis of Time-Based Pricing in Electricity Supply Chains
Baris Ata, Professor, Booth School of Business, United States  
Aslilgul Duran, Student, Northwestern University, United States  
Ozge Islegen, Assistant Professor, Northwestern University Kellogg School of Management, United States  

We empirically evaluate the impacts of time-based tariffs on the electricity supply chain. Optimal time-based tariffs reduce peak demand without significantly changing consumers’ electricity bills. Seasonal time-of-use rates can capture most benefits of real-time pricing. The environmental impact of such tariffs depends on the generator mix in a given region.

065-1440  Kicking Ash: Who (Or What) Is Winning the War on Coal?
David Drake, Assistant Professor, Harvard University, United States  
Jeff York, Assistant Professor, University of Colorado Boulder, United States  

Power generators throughout the U.S. have shed coal capacity at an unprecedented rate over the past few years. Multiple stakeholders have claimed credit - natural gas executives, policy makers, and environmental NGOs. In this nascent work, we explore the extent to which each has impacted the expected life of coal-fired power generating units.
065-1711  Feed-In Tariff Versus Rebate for Renewable Energy Generation
Ruben Lobel, Assistant Professor, University of Pennsylvania, United States
Volodymyr Babich, Associate Professor, Georgetown University, United States
We compare two types of subsidies used to stimulate renewable energy generation: a feed-in tariff and an upfront rebate. The former guarantees a steady cash flow over the long term, while the latter reduces the upfront capital requirement. We show how uncertainty and strategic customer behavior determine policy efficiency.

Xinyuan Zhu, Student, University of Maryland, United States
Qingbin Cui, Associate Professor, University of Maryland, United States
We present a new approach to PPA contract design under uncertain production and electricity prices. This method optimizes key parameters including delivery price and guarantee, outperformance price, and escalation rate to maximize long-term profitability. We present a heuristic optimization algorithm and demonstrate it using the Cape Wind offshore project.

065-1036  Success Factors of ERP Implementation in Small Firms: A Tale of Two Countries
Mohammad Daneshvar Kakhki, Student, University of North Carolina Greensboro, United States
Vidyaranya Gargeya, Professor, University of North Carolina Greensboro, United States
Many researchers have studied success factors of Enterprise Resource Systems (ERP) implementation in large and small companies, primarily in developed countries. This study presents the lessons learned from two case studies of ERP implementation in small companies, one each in a developed and a developing country.

065-1973  Dynamic Coevolution of Supply Network Structure: Accessibility and Interconnectedness
Hyunwoo Park, Lecturer, Georgia Institute of Technology, United States
Marcus Bellamy, Assistant Professor, Boston University, United States
Rahul Basole, Associate Professor, Georgia Institute of Technology, United States
We present the coevolution trajectory of the global supply network. We empirically show the negative feedback loops between two structural antecedents of supply network innovation: accessibility and interconnectedness. We find that absorptive capacity and industry growth moderate the feedback loops. We use a multi-method approach to test our hypotheses.

065-1743  Monitoring Production and Logistics Processes with the Help of Industrial Image Processing
Cyril Alias, Student, University of Duisburg-Essen, Germany
Cagdas Oezguer, Student, University of Duisburg-Essen, Germany
Bernd Noche, Professor, University of Duisburg-Essen, Germany
We present an insight into IIP applications in production and logistics. With the increasing prevalence of industrial image processing (IIP) in business processes in general and in logistics and transport operations in particular, several application areas and business functions could be identified as suitable for camera-based monitoring tasks.

065-1354  A Tangled Web: Evaluating the Impact of Displaying Fraudulent Reviews
Uttara Ananthakrishnan, Student, Carnegie Mellon University, United States
Beibei Li, Assistant Professor, Carnegie Mellon University, United States
Michael Smith, Professor, Carnegie Mellon University, United States
The growing interest in social media for legitimate promotion has been accompanied by an increasing number of fraudulent reviews. We study how consumers respond to potentially fraudulent reviews and how review portals can leverage such knowledge to design better fraud management policies.

065-1396  An Empirical Study of Predictive Analytics with Unstructured Electronic Word of Mouth Data
Shawn Mankad, Assistant Professor, Cornell University, United States
Text data is playing an increasingly important role within the business world for economic analyses and operations management. There are many ways to summarize and transform unstructured data into actionable insights. We compare several modern text analysis methods for prediction of economic outcomes to derive guidelines for researchers and practitioners.

065-1519  Using Direct Response Strategies to Manage Customer Opinions: A Stochastic Structural Approach
Vijay Mookerjee, Professor, University of Texas Dallas, United States
Mingwen Yang, Student, University of Texas Dallas, United States
Eric Zheng, Professor, University of Texas Dallas, United States
We study the problem of devising an appropriate strategy for a firm to respond to online customer reviews. We develop a stochastic structural model that describes the evolution of review ratings over time for a given response strategy. We empirically validate the model, and operationalize the theoretical response strategy.

065-1666  Restaurant Hygiene Grades and Online Reviews: A Text-Based Analysis
Jorge Mejia, Student, University of Maryland, United States
Shawn Mankad, Assistant Professor, Cornell University, United States
Anand Gopal, Associate Professor, University of Maryland, United States
We compare two types of subsidies used to stimulate renewable energy generation: a feed-in tariff and an upfront rebate. The former guarantees a steady cash flow over the long term, while the latter reduces the upfront capital requirement. We show how uncertainty and strategic customer behavior determine policy efficiency.
We analyze the large amounts of text in online reviews for restaurants in NYC to provide a scalable method for early detection of restaurants with hygiene problems. By understanding the semantic structure by which customers discuss and review restaurants, we are able to understand the language associated with restaurants more likely to have inspection violations.

065-2072 Meet the POM Editors 2
Chair(s): Kalyan Singhal

Conference participants are invited to meet the Production and Operations Management Journal’s departmental editors and the editor-in-chief to discuss any publication issues. All are welcome.

065-0120 Sourcing Innovation: Public and Private Feedback in Contests
Chair(s): Ersin Korpeoglu

Contests, in which contestants compete for a prize offered by a contest holder, have become a popular way to source innovation. This paper sets out to establish a comprehensive understanding of how to give feedback in a contest by answering the questions of when and how to give feedback.

065-0446 Innovation Tournaments with Multiple Contributors
Chair(s): Ersin Korpeoglu

We study an innovation tournament wherein an organizer seeks multiple solutions from agents. Agents’ solutions depend on their efforts, technical uncertainty, and the organizer’s subjective taste. We show a winner-takes-all award scheme is optimal under many distributions. More participants may induce agents to increase effort, and may benefit the organizer.

065-1927 Using Boot-Strapping Techniques for Analysis of Iteration in Incremental Product Development
Chair(s): Roula Michaelides

We use the boot-strapping technique to identify statistical parameters and build models for identifying and estimating rework effort using generalized linear models. The models are validated using boot-strapping methods and we discuss several managerial insights. Our results were obtained using analysis of defects from semiconductor design at Texas Instruments.

065-1355 Dynamic Collaborative Social Practice in Operations and Projects: Collaborative Innovation Revisited
Chair(s): Roula Michaelides

We explore ways in which collaborative innovation may be fostered in operations/project management. We report insights from a large inductive study on social-dynamic interactions involving multi-industry operations/project practitioners. By exploring inherent dynamics enabling/constraining practitioners in complex, uncertain environments help reveal factors influencing their ability to collaborate and achieve innovative potential.

Chair(s): Haoying Sun

Lean practices in production settings stemmed from process improvement initiatives such as increased efficiency, waste elimination, and improved quality. We view lean implementation from a learning curve and knowledge management perspective. We investigate these practices in terms of knowledge management in a product development environment.

065-0380 Add-On Pricing Policies Under Uncertainty
Chair(s): Haoying Sun

Add-on products can be sold individually and/or bundles with the base product. Consumers are uncertain about add-on values when purchasing the base product. We first characterize the optimal selling strategies under various scenarios for a monopoly seller, then consider duopoly competition with symmetric firms.

065-0939 Group-Buying Vouchers and Customers’ Perceived Ease of Use
Chair(s): Haoying Sun

We first characterize the optimal selling strategies under various scenarios for a monopoly seller, then consider duopoly competition with symmetric firms.
We develop a two-stage model to examine the design and profitability of online discount vouchers. By analyzing price discrimination and advertising effects simultaneously, we demonstrate that customers make their decisions based not only on the discount rate, but also on the perceived ease of use of the voucher.

**Chair(s):** Esther Mohr

**Session:** Decision-Making Under Uncertainty

**Track:** Supply Chain Risk Management

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
| 065-1154   | Online Reviews and Collaborative Service Provision: A Signal-Jamming Model | Haoying Sun, Assistant Professor, Texas A&M University College Station, United States  
Lizhen Xu, Assistant Professor, Georgia Institute of Technology, United States |
| 065-1185   | Can We Trust Online Physician Ratings? Evidence From Cardiac Surgeons in Florida | Feng (Susan) Lu, Assistant Professor, Purdue University, United States  
Huaxia Rui, Assistant Professor, University of Rochester, United States |

We study the provision of collaborative services under online reviews. Clients give reviews based on their net utility upon service completion. The service provider's inherent type is unobservable, and the market infers the provider type through observable signals such as the service outcome, the client review, or both.

Due to persisting economic instability, automotive suppliers are concerned with managing flexibility and deriving robust plans to prepare for a new economic downturn as seen during financial crises. In this paper, we develop a corresponding robust optimization approach for disruptive demand environments considering the specific requirements of automotive suppliers.

**Chair(s):** Esther Mohr

**Session:** Decision-Making Under Uncertainty

**Track:** Supply Chain Risk Management

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
| 065-0611   | Robust Planning in Automotive Supplier Production Networks: Preparing for Economic Crises | Semen Nikolajewski, Student, German Graduate School of Management & Law, Germany  
Gerd Hahn, Professor, GGS Heilbronn, Germany  
Sven Woogt, Logistics Process Planner, Robert Bosch Korea Ltd., Korea, Republic of (South Korea) |

Due to persisting economic instability, automotive suppliers are concerned with managing flexibility and deriving robust plans to prepare for a new economic downturn as seen during financial crises. In this paper, we develop a corresponding robust optimization approach for disruptive demand environments considering the specific requirements of automotive suppliers.

**Chair(s):** Esther Mohr

**Session:** Decision-Making Under Uncertainty

**Track:** Supply Chain Risk Management

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
| 065-1452   | Risk Mitigation of Production Hedging | John Park, Assistant Professor, Syracuse University, United States  
Burak Kazaz, Associate Professor, Syracuse University, United States  
Scott Webster, Professor, Arizona State University Tempe, United States |

We examine how a firm can mitigate global economic risk through production hedging, defined as producing less than the total demand. We investigate a firm’s production planning, pricing, and financial hedging decisions under exchange-rate and demand uncertainty, with the objective of maximizing expected profit while complying with a value-at-risk constraint.

**Chair(s):** Esther Mohr

**Session:** Decision-Making Under Uncertainty

**Track:** Supply Chain Risk Management

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
| 065-0979   | A Trade Credit Model with Asymmetric Retailers | Baofeng Zhang, Student, University of Science & Technology, China  
Desheng Wu, Professor, Stockholm School of Economics, Sweden  
Liang Liang, Professor, University of Science & Technology, China |

We examine the impact of limited liability and competition on operational decisions in a distribution channel consisting of a manufacturer and two asymmetric newsvendors. A subgame Nash equilibrium of inventory is derived, showing that the initial capital and competition have a significant impact on the system's decisions.

**Chair(s):** Esther Mohr

**Session:** Decision-Making Under Uncertainty

**Track:** Supply Chain Risk Management

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
| 065-1247   | Censored Demand News-vendor and Prediction with Expert Advice | Esther Mohr, Assistant Professor, University of Mannheim, Germany  
Semen Nikolajewski, Student, 1979, Germany |

We consider the newsvendor problem in a distribution-free setting when learning from experts. Assuming demand is known to varying degrees, we suggest two Euclidean Distance Algorithms (EDA) that adaptively converge towards the critical fractile solution in finite-time. Experimental results show the near-optimal behavior of EDA for different types of unknown distributions.

**Chair(s):** Juan Serpa

**Session:** Supply Networks Analytics Mini Series 3

**Track:** Supply Chain Analytics

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
| 065-0218   | Mitigating Disruption Cascades in Supply Networks | Nitin Bakshi, Assistant Professor, London Business School, United Kingdom  
Shyam Mohan, Student, London Business School, United Kingdom |

The supply-chain losses from disasters arise not only through direct damage at firms, but also due to disruption cascades from suppliers in the adjacent tiers and beyond. We study how firms can invest to mitigate such disruption cascades, and characterize the role of network topology in such decisions.

**Chair(s):** Juan Serpa

**Session:** Supply Networks Analytics Mini Series 3

**Track:** Supply Chain Analytics

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
| 065-0510   | Decoupling the Supply Chain with a Dynamic Discrete Choice Inventory Model | Robert Bray, Assistant Professor, Northwestern University, United States  
Yuliang Yao, Associate Professor, Lehigh University, United States |

Most supply chain coordination works assume retailers can communicate costs with suppliers. But this is implausible because the store has an incentive to exaggerate costs. We resolve this cheap talk problem by structurally estimating the retailer's private costs. We demonstrate with a 5,320-SKU, 1,371-day sample from a Chinese supermarket.
We present an analysis of survey data collected from 95 green organizations in southwest Florida that are engaged in sustainable management practices. We determine maturity levels in environmental, social, and economic sustainability, and discuss further sustainability strategies and profiles for each sector.
Iain Reid, Senior Lecturer, University of Huddersfield, United Kingdom

Professional Service Operations Management: The case for Leaner Law

Evanielle Ferreira, Student, Faculdade Santo Agostinho, Brazil

Iain Reid, Senior Lecturer, University of Huddersfield, United Kingdom

Professional Service Operations Management: The case for Leaner Law

Resource Based View (RBV) is used as the core theoretical framework to address leanness in the four UK legal service network and service offering.
We investigate the conditions for server sharing between two service territories. In particular, we use simulation to explore the impact of additional travel time and server utilization on server sharing decisions between two territories.

We consider a supply chain consisting of a national brand supplier and a retailer which intends to develop its own store brand. We develop a game-theoretic framework to analyze the strategic interaction between the two players in the presence of asymmetric information.

We investigate the pricing and channel management strategy for a car manufacturer when it operates its own leasing channel. Regulatory cost plays an important role in leasing channel management. When the regulatory cost is large, a decentralized channel structure is more beneficial than a centralized structure.

We model a retailer maximizing his profits using paid search in a multi-period setting where customers’ willingness to pay is a function of inventory-on-hand. Using the Stochastic Dynamic Programming method, we study the bid and price decisions. Our findings indicate that bid and price can be used as levers at low and high inventory levels respectively.

We investigate the effects of an accrual constraint in cooperative advertising on channel profits, pricing and advertising decisions using a game theoretic model. We find that the use of an accrual constraint can increase or decrease overall channel profits depending on the levels of participation and accrual rates.

This research aims to analyze the consumption practices of beauty products for men. The results demonstrate how male consumers perceive beauty products. This information can assist operations managers in generating a product (packaging, colors, names and smells) that differentiates male consumption from female consumption.
**Saturday, 03:15 PM - 04:45 PM**

### 065-0229 Optimizing Population Screening for Infectious Diseases: The Case of HAT Disease Control in D.R. Congo

**Chair(s):** Nathan Kunz

Harwin de Vries, Student, Erasmus University Rotterdam, Netherlands  
Albert Wagelmans, Professor, Erasmus University Rotterdam, Netherlands  
Joris Van de Klundert, Professor, Erasmus University Rotterdam, Netherlands

We consider the following planning problem: given the expected evolution of an epidemic in a given set of villages, which villages should be screened when? We present descriptive models for the disease burden corresponding to a plan, and use these to develop, analyze and optimize several classes of planning policies.

### 065-0256 On- and Off-Shore Prepositioning and Delivery Mechanism for Sudden-Onset Disaster Response

**Chair(s):** Nathan Kunz

Mehdi Shanifyazdi, Associate Professor, BI Norwegian Business School, Norway  
Kaustubh Navangul, Student, BI Norwegian Business School, Norway  
Marianne Jahre, Professor, 1979, Norway

This paper investigates efficiency improvements of relief operations by studying effects of on- and off-shore pre-positioning of emergency relief items. An optimization model, which trades off different logistics costs in order to find the best combination of disaster relief methods, is formulated and tested empirically using real world cases.

### 065-1359 Inventory Management in Developing Countries' Health Care Facilities: Issues, Challenges, and an Intervention

**Chair(s):** Nathan Kunz

Nonlanhla Dube, Student, University of Groningen, Netherlands  
Koos De Gis, Student, University of Groningen, Netherlands

In trying to understand inventory management practices in health-care facilities in developing countries, we found that wastage and shortages co-exist. This outcome is explained by the varied responses to similar challenges that are informed by facility funding levels. A solution to some of the major problems is proposed and piloted.

### 065-0222 Fleet Size Prediction in Humanitarian Operations

**Chair(s):** Nathan Kunz

Nathan Kunz, Assistant Professor, University of North Florida, United States  
Luk van Wassenhove, Professor, INSEAD, France  
Othman Boufaied, Student, INSEAD, France

Vehicles are important assets in humanitarian operations that generate significant costs. Relief organizations often struggle to know the right number of vehicles they need in each operation. We develop a multiple regression model based on empirical data that predicts the right fleet size for each operation.

### 065-0121 Allocation of Greenhouse Gas Emissions in Supply Chains

**Chair(s):** Luyi Gui

Greys Sosic, Associate Professor, University of Southern California, United States  
Sanjith Gopalakrishnan, Student, University of British Columbia, Canada  
Daniel Granot, Professor, University of British Columbia, Canada  
Frieda Granot, Professor, University of British Columbia, Canada  
Hailong Cui, Student, University of Southern California, United States

We formulate the greenhouse gas emission responsibility problem as a cooperative game, prove it has a nonempty core, and identify some allocations that are extreme core points. We derive a simple and intuitive expression for the Shapley value of this game and provide its three distinct axiomatic characterizations.

### 065-0344 Investment in Environmental Process Improvement in Response to Regulation

**Chair(s):** Luyi Gui

Cheryl Gaimon, Professor, Georgia Institute of Technology, United States  
Wenli Xiao, Assistant Professor, University of San Diego, United States  
Ravi Subramanian, Associate Professor, Georgia Institute of Technology, United States  
Markus Biehl, Associate Professor, York University, Canada

We analyze a firm's dynamic investment in environmental process improvement (EPI) to reduce environmental impact (EI) in response to regulation. The dynamic investment in EPI differs substantially in response to short-term versus long-term incentives for EI. We discuss the impacts of penalties, subsidies, and production quantity on the investment decision.

### 065-0528 Impact of Certification Programs on Waste Recovery

**Chair(s):** Luyi Gui

Gökce Esenduran, Assistant Professor, Ohio State University, United States  
Yen-Ting Lin, Assistant Professor, University of San Diego, United States  
Wenli Xiao, Assistant Professor, University of San Diego, United States  
Minyue Jin, Student, University of San Diego, China

There are two main certification programs for e-waste recyclers that are different in stringency. The more stringent one is costlier to implement but results in higher product returns. We model the competition between recyclers and examine how product reselling, customers' greenness, and economies of scale affect recyclers' certificate adoption decisions.

### 065-1016 Inducing Environmental Disclosures: A Dynamic Mechanism Design Approach

**Chair(s):** Luyi Gui

Shouqiang Wang, Assistant Professor, Clemson University, United States  
Peng Sun, Professor, Duke University Durham, United States  
Francis De Vericourt, Professor, ESMT, Germany
We study the design of voluntary disclosure regulation that jointly uses inspections and disclosure rewards. We formulate this problem in a dynamic mechanism design framework with state verification in continuous-time and obtain complete analytical solution. The optimal policy demonstrates cyclic structure, which is appealing in practice.

**Saturday, 03:15 PM - 04:45 PM**

**291 Saturday, 03:15 PM - 04:45 PM, Salon 3**  
**Session:** Product Strategies in Supply Chain Management  
**Chair(s):** Cuihong Li, Laurens Debo

**065-0064** Assortment and Production Strategies Under Flexible Technologies  
Lingxiu Dong, Professor, Washington University St Louis, United States  
Du Shi, Student, Washington University St Louis, United States  
Fugiang Zhang, Professor, Washington University St Louis, United States

This paper characterizes a firm's assortments and production strategies under two types of flexible technologies: traditional flexible technology and 3D printing. We also show that adopting traditional flexible technology in addition to dedicated technology may reduce product variety, while 3D printing always enhances product variety.

**065-0465** Product Quality Differentiation through Information Provision  
Haresh Gurmani, Professor, Wake Forest University, United States  
Huaqing Wang, Student, St. Thomas University, United States  
Raphael Boleslavsky, Assistant Professor, University of Miami, United States

We examine the joint interaction of information provision and pricing decisions by two competitive firms when a buyer is uncertain about product valuations. Firms generate product differentiation by allowing consumers to learn about valuations or prevent them from doing so. We characterize equilibrium prices and its interaction with information policies.

**065-0351** Product Line Design: Variety and Responsiveness  
Laurens Debo, Associate Professor, Dartmouth College, United States  
Cuihong Li, Associate Professor, University of Connecticut Storrs, United States

A larger product variety allows a firm to better satisfy the needs of heterogeneous customers, but, in a make-to-order environment, it increases the job completion time, leading to longer waiting times for the customers. We study the trade-off between product variety and responsiveness to align product line design and operations system design.

**065-0785** Observational Learning in a System with Multiple Options: Wisdom of Minority  
Chen Jin, Student, Northwestern University, United States  
Laurens Debo, Associate Professor, Dartmouth College, United States  
Seyed Iravani, Professor, Northwestern University, United States  
Mirko Kremer, Professor, Frankfurt School of Finance & Management, Germany

We consider a system with quality uncertainty among multiple options where quality information is only known to some, but not all, customers (informed vs. uninformed customers). We derive the equilibrium choice strategy of uninformed customers and test the model in the laboratory, using random choice theory to explain the discrepancy.

**292 Saturday, 03:15 PM - 04:45 PM, Salon 6**  
**Session:** Best Paper Session  
**Chair(s):** Anita Tucker, Sarang Deo

**065-0942** Placeholder for Best Paper Competition  
Anita Tucker, , Brandeis International Business School, United States

In this session, the healthcare operations management session's best paper finalists will present.

**293 Saturday, 03:15 PM - 04:45 PM, Salon 7**  
**Session:** Panel: The Future of Service Operations Research  
**Chair(s):** Joy Field

Liana Victorino, Associate Professor, University of Victoria, Canada  
Joy Field, Associate Professor, Boston College, United States  
Aleda Roth, Professor, Clemson University, United States  
Rohit Verma, Professor, Cornell University, United States  
Ryan Buell, Professor, Harvard University, United States  
Michael Dixon, Assistant Professor, Naval Postgraduate School, United States  
Jie Zhang, Assistant Professor, University of Vermont, United States

To inspire future service operations research, a panel of leading service operations researchers will moderate an interactive conversation about cutting edge research topics and innovative empirical methods. Panelists will also discuss opportunities and strategies for publishing service operations research in service-oriented journals such as the Journal of Service Management.

**294 Saturday, 03:15 PM - 04:45 PM, Salon 8**  
**Session:** Behavioral Decision Making  
**Chair(s):** Soohnhong Min

**065-0717** Regulating Forecast Adjustments for Promotional Demand Forecasting: A Field Experiment
065-062  Human Behavior in Project Portfolio Selection: Insights from an Experimental Study
Rainer Kolisch, Professor, Technische Universität München, Germany
Sebastian Schifflers, TUM School of Management, Germany
Thomas Fiedner, Consultant, Technische Universität München, Germany

We investigate how decision makers behave in the context of project portfolio selection using an experimental study based on the knapsack problem. We investigate subjects' adherence to simple constructive heuristics, motivated by portfolio selection practice. Decision making is partially explained by adherence to two heuristics.

065-0773  The Effects of Judgmental Forecasting On Packaging Operations of Perishable Products
H. Niles Perera, Student, The University of Sydney, Australia
Behnam Fahimnia, Associate Professor, The University of Sydney, Australia
Eliot Bendoly, Professor, Ohio State University, United States
Nathan Craig, Assistant Professor, Ohio State University, United States
Mohsen Reisi, Lecturer, The University of Sydney, Australia

This research investigates how biases and inefficiencies from behavioral forecast adjustments can influence packaging operations and the associated packaging wastes in a perishable product supply chain. A set of semi-structured interviews are conducted in an Australian rice producer to understand the underlying factors and facilitate further experimental investigation.

296  Saturday, 03:15 PM - 04:45 PM, Lanai
Session: Emerging Research in Behavioral Operations
Chair(s): Ryan Buell

065-0679  Stagnant Leader or Fast Improver? The Impact of Information Transparency on Consumers' Purchase Behavior
Ryan Buell, Professor, Harvard University, United States
Shwetha Mariadassou, Student, Massachusetts Institute of Technology, United States
Yanchong Zhong, Assistant Professor, Massachusetts Institute of Technology, United States

We study how consumers' purchase behavior may be influenced by a company's information transparency in its sustainability performance. We consider interaction between transparency and two types of information: current performance level and changes in performance. Our results yield important insights about a company's transparency strategy in the marketplace.
Saturday, 03:15 PM - 04:45 PM

065-1308  Last Place Aversion in Queues
Ryan Buell, Professor, Harvard University, United States
Michael Norton, Professor, Harvard University, United States
Since customers dislike waiting, much of the existing queuing research concentrates on what's taking place ahead of the customer in line (service rate, queue length, etc.). We examine the extent to which what's taking place behind the customer (whether they are last in line) influences their perceptions and behaviors.

065-1446  Influence of Contract Type on Product Stocking Decisions
Anna Devlin, Assistant Professor, University of Alabama Huntsville, United States
Rebecca Hamilton, Professor, Georgetown University, United States
Wedad Elmaghraby, Associate Professor, University of Maryland, United States
We experimentally explore the impact of contract type on the stocking decisions facing a retailer. The choice facing the retailer is similar in nature to a multi-armed bandit problem; we present initial results and frame the choice to within an explore versus exploit paradigm.

065-0455  Should Suppliers Bear The Qualification Costs? Theory and Experiments
Wei Chen, Assistant Professor, University of Kansas, United States
Milind Dawande, Professor, University of Texas Dallas, United States
Ganesh Janakiraman, Professor, University of Texas Dallas, United States
Elena Katok, Professor, University of Texas Dallas, United States
A firm needs to source from a fixed-size pool of yet-to-be qualified suppliers for an indivisible contract. The contract must be awarded to a supplier who passes a costly qualification test. We investigate the following questions: Should suppliers bear the qualification costs in mechanisms that are optimal for the buyer?

065-0428  An Empirical Study of Liquidation Value for Retail Inventories
Nathan Craig, Assistant Professor, Ohio State University, United States
Ananth Raman, Professor, Harvard University, United States
The liquidation value of a firm's assets is an input to numerous models. Our research characterizes liquidation values in practice and identifies factors that affect liquidation value. In the context of retail inventories, we analyze data from multiple sources to identify economic factors that significantly impact inventory liquidation value.

065-0879  Rewarding Service and Serving Rewards: Strategic Complications to Order Management
Somak Paul, PhD Student, Ohio State University, United States
Nathan Craig, Assistant Professor, Ohio State University, United States
Elliot Bendoly, Professor, Ohio State University, United States
We conduct laboratory experiments to identify how certain strategic-level factors relating to demand management affect the ordering behavior of those in purchasing management roles by shifting the focus on fulfillment by including a profit-maximization objective, and making purchasing managers aware of a dependent relationship between inventory service level and demand.

065-0950  Judgmental Forecast Adjustment in Light of Sales Promotions: an Experiment
Jason Hurley, PhD Student, The University of Sydney, Australia
Behnam Fahimnia, Prof of Syupply Chain Management, The University of Sydney, Australia
Elliot Bendoly, Professor, Ohio State University, United States
Nathan Craig, Assistant Professor, Ohio State University, United States
Mohsen Reisi, The University of Sydney, Australia
We investigate the degree to which sales promotions can impact judgmental forecast adjustments. A series of interviews were conducted at Coca-Cola Amatil, Australia. We designed a laboratory experiment to explore the behavioral factors that decrease the ability of managers to accurately adjust statistical forecasts.

065-1152  A Review and Analysis of Vendor Compliance Programs: The Performance Metrics and Chargebacks in Retailing
Chun-Min (Jimmy) Chen, Assistant Professor, Bucknell University, United States
Retailers use chargebacks to motivate vendors to fulfill purchase orders according to performance metrics outlined in vendor compliance programs. Using a sample of vendor compliance programs, I statistically analyze the relationship between the performance metrics and chargebacks to explore opportunities for advancing supplier-retailer collaboration.

065-1864  Emissions and Firm Performance: An Empirical Study of Global Firms
Sining Song, Student, Arizona State University Tempe, United States
Yan Dong, Assistant Professor, University of South Carolina, United States
Craig Carter, Associate Professor, Arizona State University Tempe, United States
Kefeng Xu, Associate Professor, University of Texas San Antonio, United States
Globalization creates new market and improves cost efficiency, but it also stretches supply chains which may increase supply chain wide emissions. This study focuses on the effect of emissions on financial performance of global firms, and empirically examines how firms may improve financial performance by implementing environmental programs.

065-1701  Hotel Performance Enhancement: A Description of the Honduran Tourism Ambience Evolution around the Local Market
Cesar Ortega, Student, Universidad Nacional Autonoma de Honduras, Honduras
Saturday, 03:15 PM - 04:45 PM

The present analysis provides an overall view of how the Honduran small, medium and large hotel firms are evolving, despite the many difficulties encountered, during their preregistration and registration processes, due to the violent and insecure business scenario, blending into the concept of "Sustainable T".

065-0878 The Environmental-Financial Performance Link: The Customer-Side Effect
Chien-Ming Chen, Nanyang Technological University, Singapore
Dixon Ho, Assistant professor, Nanyang Technological University, Singapore

The question of whether superior environmental performance can enhance profitability has attracted a lot of attention. However, previous studies overlook customers’ explicit role in this relationship. Using multiple-year data, we contributes to this literature by examining how customer-side factors may affect this relationship.

065-2025 The State of Logistics Research: Present & Future
Thomas Goldsby, Professor, Ohio State University, United States

The field of logistics is experiencing unprecedented growth in economic and strategic significance. This presents immense opportunities for logistics researchers to explore fascinating new questions, employ new methods, and generate new business insights. This session examines the burgeoning opportunities available to logistics researchers.

065-2026 A Qualitative Exploration of Big Data in International Supply Chain Management: Key Success Factors
R. Glenn Richey, Professor, Auburn University, United States
Tyler Morgan, Assistant Professor, Iowa State University, United States

Although “Big Data” has become a buzz word recently, there is confusion about its meaning, purpose, or role in supply chain management. We attempt to develop a managerial understanding of Big Data in a supply chain relationships context using a process-based perspective. We then explore Key success factors regarding using Big Data in supply chain management.

065-0777 A Longitudinal Study of the Relationship Between IT Sourcing Strategy and Hospital Performance
Kaitlin Wowak, Assistant Professor, University of Notre Dame, United States
Corey Angst, Associate Professor, University of Notre Dame, United States
Ken Kelley, Professor, University of Notre Dame, United States

While the value of IT in the healthcare industry is well-studied, little research examines how IT sourcing strategy relates to hospital performance. We address this gap using data on all U.S. hospitals that operated continuously over an 8-year time-frame to examine how a hospital’s IT sourcing strategy impacts its patient-centric performance.

065-0802 Services Sourcing Emphasis and Hospital Performance
Sachin Modi, Associate Professor, Iowa State University, United States
Peter Salzarulo, Associate Professor, Miami University, United States
Saurabh Mishra, Associate Professor, Mcgil University, Canada

Hospital administrators often face the dilemma of contracting for services vs. employing service providers. However, evidence on the relationship of relative emphasis on sourcing with hospital performance is sparse. To address this issue, we examine the effect of hospital service sourcing emphasis on operating margin and average length of stay.

065-1198 End-Of-Life Consumer Electronic Goods Reverse Logistics: Characteristics and Challenges of the Brazilian Case
Orlando Cattini Junior, Associate Professor, Fundacao Getulio Vargas, Brazil

Hospital administrators often face the dilemma of contracting for services vs. employing service providers. However, evidence on the relationship of relative emphasis on sourcing with hospital performance is sparse. To address this issue, we examine the effect of hospital service sourcing emphasis on operating margin and average length of stay.
In Brazil, most end-of-life consumer electronic goods are not properly recycled, causing, in addition to losses, serious hazards to those who handle them and to the environment. The aim of this work is to study the recycling of Brazilian end-of-life consumer electronic goods case, pointing out some difficulties and challenges.

We propose a mix integer linear programming model for redesigning the logistics network of an omnichannel retailer. The IP model determines the forward and reverse material flows that minimize costs, while taking into account the dependency between customer demand and the availability of new channels through an embedded regression model.

In this study, we propose a hybrid manufacturing/remanufacturing system including refurbishing process. First, we carry out scenarios and numerical experiments that assumed a closed loop supply chain multifunction printers. We clarified that the proposed hybrid manufacturing/remanufacturing system is able to make more profit.

We explore the application of circular economy principles for designing product refurbish operations, adopting the desk-based research approach. We present the circular economy principles formulated to support the design of product refurbishment, developing mathematical problems to support low-level design.

We formally formulate and investigate the so-called sum-product ratio problem. Since this problem is generally NP-hard, we develop a fully polynomial-time approximation scheme - the best possible approximation we can expect for NP-hard problems. We also discuss its potential applications and useful extensions, including the consideration set formation with search cost.

We study a model of competition in network revenue management where multiple risk-averse players compete to satisfy uncertain consumer demand. In a symmetric game with a linear inverse demand function, we can derive a closed form expressions for equilibrium quantities and prices and establish monotonicity properties.

We study the non-stationary version of the correlated multi-armed bandit problem where the correlations between the rewards from different bandits and at different times are captured by a Gaussian process. We identify the rate at which the optimal regret grows and provide an algorithm that achieves the optimal regret.

We investigate sourcing decisions of firms that want to source sustainably-produced parts, e.g., organic ingredients, in order to offer sustainable products. We examine how the firm's sourcing policy and competition can influence an upstream supplier's decision to convert to a new sustainable processing standard.
Yanchong Zheng, Assistant Professor, Massachusetts Institute of Technology, United States

We conduct an experiment to investigate the roles of trust and trustworthiness in consumers' willingness-to-pay for social responsibility. Specifically, we analyze how trust and trustworthiness are affected by the level of transparency regarding social responsibility practices in supply chains.

<table>
<thead>
<tr>
<th>Session: Design and Technology Choice for Recycling: The Value of Capacity Ownership and Collaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luyi Gui, Assistant Professor, University of California Irvine, United States</td>
</tr>
<tr>
<td>Morvarid Rahmani, Assistant Professor, Georgia Institute of Technology, United States</td>
</tr>
<tr>
<td>Atalay Atasu, Associate Professor, Georgia Institute of Technology, United States</td>
</tr>
</tbody>
</table>

Efficient and effective treatment of end-of-life products requires not only product design improvements but also advancement in recycling technologies. We study how recycling capacity ownership by OEMs would affect incentives for improving product recyclability and processing technology, in particular when the capacity may be shared in a manufacturer consortium.

<table>
<thead>
<tr>
<th>Track: Information in Operations Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturday, 03:15 PM - 04:45 PM, Kahill</td>
</tr>
<tr>
<td>Chair(s): Hong Guo</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session: Promotions in Free-to-Play Mobile Games: A Competitive Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yipeng Liu, Assistant Professor, Northern Illinois University, United States</td>
</tr>
<tr>
<td>Sean Marston, Assistant Professor, Western Kentucky University, United States</td>
</tr>
<tr>
<td>Ismail Civelek, Assistant Professor, Western Kentucky University, United States</td>
</tr>
</tbody>
</table>

Dramatic improvements in high-speed and mobile connectivity have been changing the way people enjoy games. In-game purchases, virtual currency, promotion design for heterogeneous consumers and strong competition are key challenges for game providers. This paper addresses the determination of the optimal in-game purchase level for a game provider.

<table>
<thead>
<tr>
<th>Track: Information in Operations Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturday, 03:15 PM - 04:45 PM, Lily</td>
</tr>
<tr>
<td>Chair(s): Lizhen Xu</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session: Consumer Analytics in Digital Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yipeng Liu, Assistant Professor, Northern Illinois University, United States</td>
</tr>
<tr>
<td>Sean Marston, Assistant Professor, Western Kentucky University, United States</td>
</tr>
<tr>
<td>Ismail Civelek, Assistant Professor, Western Kentucky University, United States</td>
</tr>
</tbody>
</table>

We empirically examine the impact of popular social media platforms such as Twitter, Facebook, Skype, and LinkedIn on cultural dimensions in an organizational context. Media Synchronicity Theory (MST) serves as the foundation to analyze the relationship between social media usage and cultural dimensions, and to derive the implications for organizations.

<table>
<thead>
<tr>
<th>Track: Information in Operations Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturday, 03:15 PM - 04:45 PM, Lily</td>
</tr>
<tr>
<td>Chair(s): Lizhen Xu</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session: Mobile Data Usage under Flexible Usage Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kartik Babu Nattamai Kannan, Student, Scheller College of Business, United States</td>
</tr>
<tr>
<td>Yu Jeffrey Hu, Associate Professor, Georgia Institute of Technology, United States</td>
</tr>
<tr>
<td>Sridhar Narasimhan, Professor, Georgia Institute of Technology, United States</td>
</tr>
</tbody>
</table>
We examine the impact on daily data consumption of a flexible data usage plan in which customers can use the current month’s unused data in the next month. We study data patterns from a data usage accounts and develop statistical models to describe data usage.

065-0182  Mismatched Social Support and Health Outcome in an Online Weight Loss Community
Lucy Yan, Assistant Professor, Indiana University, United States

In this study, we examine how social support can help individuals to lose more weight. Based on optimal matching theory, we differentiate support reciprocity into providing and seeking intentions and examine whether the matching of needed and received social support would affect individuals’ weight loss outcome distinctly.

065-1465  An Individual Level Preference Model for Predicting New Product Diffusion
Nachiketa Sahoo, Assistant Professor, Boston University, United States
Nitin Joglekar, Associate Professor, Boston University, United States

We propose a model with individual user preference structure for new product diffusion in a population. We estimate the model by using product ratings and time of consumption. We validate the model by forecasting demand of newly introduced products and explore the implications of improved forecasting for firm operations.

065-0371  Process Flexibility in a Homogeneous Production-Inventory System with Infinite Horizons
Wancheng Feng, Student, Tsinghua University, China
Max Shen, Professor, University of California Berkeley, United States

We extend process flexibility studies to a multi-period context with make-to-stock production environments. For any given flexibility design, we obtain the optimal joint productivity-inventory replenishment policy by solving a modified maximum flow problem with an efficient LP-based algorithm. Numerical results have demonstrated superb performance of the popular long chain design.

065-0260  Locating Charging Stations Based on Cooperative Coverage
Jun Yang, Assistant Professor, Huazhong University of Science & Technology, China
Lian Wu, Student, Huazhong University of Science & Technology, China

Our study follows a concept of “cooperative cover” and vehicle-refueling logics, using a mixed integer programming to formulate the recharging stations location model to meet user demand with minimum cost. We apply it to a reasonable program and analyze the difference between the new model and traditional ones.

065-0395  Sole Inventor vs. Team of Inventors: What’s Best?
Tian Chan, Student, INSEAD, Singapore
Jurgen Mihm, Associate Professor, INSEAD, France
Manuel Sosa, Associate Professor, INSEAD, Singapore

Existing empirical evidence from scientific papers and technology patents suggests that teams outperform individual inventors in creating groundbreaking innovations. In this work we use both technological and design patent data to show that the effect of teamwork depends on the type of innovation, and identify conditions where individuals outperform teams.

065-1276  Workforce Mobility and Innovation Outcomes
Philipp Cornelius, Student, University College London, United Kingdom
Bilal Gokpinar, Assistant Professor, University College London, United Kingdom
Fabian Sting, Associate Professor, Rotterdam School of Management, Netherlands

We empirically investigate how moves between problems and sites affect the innovation value created by employee ideas. Over time the innovation value of problem switching employees follows a concave pattern, whereas for site switching employees the pattern is convex. We develop a search-based framework that coherently explains these differing effects.

065-1343  The Impact of Visibility in Innovation Tournaments
In innovation tournaments, administrators face a variety of decisions that impact the outcome. We examine the effect of idea transparency on both quality and uniqueness by comparing blind and unblind contests using field experiments.

**065-0686** The Contribution of Information Engineering for Innovation Funding Source Obtainment

Taina Canteri, Student, Federal University of Paraná, Brazil
Guilherme Frederico, Professor, Federal University of Paraná, Brazil
Ricardo Junior, Professor, Federal University of Paraná, Brazil
Maria Freitas, Professor, Federal University of Paraná, Brazil
Adriana Santos, Professor, Federal University of Paraná, Brazil

Through a systematic literature review method, this exploratory study examines how the information engineering can support and improve the process of obtaining external funds to support an organization’s innovation efforts. The results show that the ability to manage information has a positive and direct influence on the performance of organizational innovation.

**065-2009** Shifting from Tacit to Explicit Knowledge

Roger Bohn, Professor, 1979, United States

A critical stage in technology/industry evolution is its first transition from tacit to mostly explicit knowledge. We quantify this shift in aviation (1940s-60s). FW Taylor did it in machining (1900s). Health care is doing it now. The new knowledge differs in content as well as form.

**065-1330** Sugar Cane Juice Extraction Innovation: Technological Prospecting Study of Diffuser Process in Brazil

Fabrício Piacente, Professor, Centro Estadual de Educação Tecnológica Paula Souza, Brazil
Denys Biaggi, Professor, Centro Estadual de Educação Tecnológica Paula Souza, Brazil
Vanessa Silva, Professor, Centro Estadual de Educação Tecnológica Paula Souza, Brazil

There are two processes for sugar cane juice extraction: the milling process and the diffuser, which is a chemical leaching process. We examine the competitive adoption of these two processes in Brazil, and both the increasing use and the evolution in the number of patent documents on the diffusion process.

**065-1724** The Impact of Formal and Informal Interaction to Knowledge Acquisition and Innovation Capability

Xueyuan Liu, Professor, Wuhan University, China
Qihai Huang, Senior Lecturer, Lancaster University, United Kingdom
Junsheng Dou, Associate Professor, Zhejiang University, China
Xiaode Zhao, Professor, China Europe International Business School, China

Results from a survey data of 278 Chinese manufacturing firms suggest that both formal and informal interaction are positively associated with knowledge acquisition, which will influence the firm’s innovation capability, and that the indirect effects of interactions on innovation capability are moderated by knowledge application.

**065-1102** Optimal Design of Name Your Own Price Auctions

John Wilson, Professor, University of Western Ontario, Canada

Name Your Own Price Options were conceived as a way to dispose of excess inventory, especially airline seats and hotel rooms. We consider the optimal number of bids and marketing channels to allow; however, unlike much of the literature, a general willingness to pay distribution is allowed.

**065-1875** Committed Pricing vs. Responsive Pricing Under Supply Uncertainty

Qingkai Ji, Student, Dalian University of Technology, China
Xiangpei Hu, Professor, Dalian University of Technology, China

We consider two pricing policies for a retailer ordering from an unreliable supplier. We study the impacts, under committed pricing, of a retailer who decides the order quantity and retail price together before receiving an uncertain supply. Under responsive pricing, the retailer orders first, waits for the actual delivery, then decides the price.

**065-1385** From Used to New: Increasing Profit Through Product Renewals

Michael Pangburn, Associate Professor, University of Oregon, United States
Euthemia Stavrulaki, Associate Professor, Bentley University, United States

In contrast with planned obsolescence, we investigate the alternative of a firm offering a refresh service to increase profits (i.e., restoring used products to like-new condition). We also show that committing in advance to the price of that service can further increase profits by indirectly providing second-period quantity commitment.
We demonstrate new supply chain exercises that complement the Internet Beer Game currently available to professors. In one game, the Disaster Relief Supply Chain Management game, students must dynamically allocate a scarce drug to victims of a terrorist attack at three separate sites. We discuss class usage of games.

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Supply Chain Risk Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-0894</td>
<td>Moderating the Effect of Information Technology on the Performance of Risk Mitigation Strategies</td>
</tr>
<tr>
<td>Richard Kraude, Michigan State University, United States</td>
<td></td>
</tr>
<tr>
<td>Siram Narayanan, Associate Professor, Michigan State University, United States</td>
<td></td>
</tr>
<tr>
<td>Sri Talluri, Michigan State University, United States</td>
<td></td>
</tr>
<tr>
<td>Information technology (IT) is frequently associated with improved supply chain performance, but its role in supply chain risk management has not been explored. By increasing communication, information sharing and alignment, IT may improve the effectiveness of risk mitigation strategies. We develop hypotheses using dual processing theory and test them empirically.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Supply Chain Risk Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-0767</td>
<td>Real Options Approaches for Sourcing Strategies under Supply Disruptions</td>
</tr>
<tr>
<td>Purushottam Meena, Assistant Professor, New York Institute of Technology, United States</td>
<td></td>
</tr>
<tr>
<td>Arnd Huchzermeier, Professor, Whu - Otto Beisheim School of Management, Germany</td>
<td></td>
</tr>
<tr>
<td>We investigate the problem of determining the optimal sourcing strategies under supplier failure risk due to the occurrence of disruptive events. Particularly, we demonstrate the use of real options for valuation of different sourcing strategies and use approximate dynamic programming (ADP) approach to solve the problem.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Supply Chain Risk Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-0966</td>
<td>Sub-Optimal Capacity Investments under Information Asymmetry</td>
</tr>
<tr>
<td>Junhyun Bae, Student, Cornell University, United States</td>
<td></td>
</tr>
<tr>
<td>William Schmidt, Assistant Professor, Cornell University, United States</td>
<td></td>
</tr>
<tr>
<td>We investigate imperfect demand information sharing in a supply chain with an external investor. We identify conditions under which firms will invest sub-optimally in capacity, thereby exposing themselves and the supply chain to disruption. We introduce a utility-sharing contract which can mitigate the impact of the firm’s capacity choices.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Supply Chain Analytics</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-0716</td>
<td>Strategic Complementarities in a Digital Advertising Supply Chain</td>
</tr>
<tr>
<td>Anitesh Barua, Associate Professor, McCombs School of Business, United States</td>
<td></td>
</tr>
<tr>
<td>Genaro Gutierrez, Associate Professor, McCombs School of Business, United States</td>
<td></td>
</tr>
<tr>
<td>Changseung Yoo, Student, McCombs School of Business, United States</td>
<td></td>
</tr>
<tr>
<td>We examine multiple pricing models in a digital advertising supply chain using a proprietary dataset. While the extant literature emphasizes choosing between pricing models, we demonstrate that using multiple models in concert yields higher overall profitability due to spillover effects and strategic complementarities among the pricing schemes.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Supply Chain Analytics</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-1344</td>
<td>A Structural Estimation of the Bullwhip Effect Using Supply Network Data</td>
</tr>
<tr>
<td>Vishal Gaur, Associate Professor, Cornell University, United States</td>
<td></td>
</tr>
<tr>
<td>Jan Fransoo, Professor, Technische Universiteit Eindhoven, Netherlands</td>
<td></td>
</tr>
<tr>
<td>Maximilian Udenio, Assistant Professor, Technische Universiteit Eindhoven, Netherlands</td>
<td></td>
</tr>
<tr>
<td>We estimate a two-stage structural model of inventory decisions using financial data for 6,040 unique supplier-customer dyads for the years 1984-2013 to investigate downstream inventory adjustments and their influence on upstream firms. Our results show that inventory cost ratios are dynamic, and a significant cause of the bullwhip effect.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Supply Chain Analytics</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-1388</td>
<td>Retailer Strategic Pricing under Consumer Rational Inattention</td>
</tr>
<tr>
<td>Xirong Chen, Student, Texas A&amp;M University College Station, United States</td>
<td></td>
</tr>
<tr>
<td>Zheng Li, Student, Texas A&amp;M University College Station, United States</td>
<td></td>
</tr>
<tr>
<td>Haoying Sun, Assistant Professor, Texas A&amp;M University College Station, United States</td>
<td></td>
</tr>
<tr>
<td>Haipeng (Allan) Chen, Associate Professor, Texas A&amp;M University College Station, United States</td>
<td></td>
</tr>
<tr>
<td>Recent economics literature has suggested that consumers may be rationally inattentive and may not respond to small price changes. Using a large dataset consisting of eight years of grocery retail data, we estimate the magnitude of consumer inattention and demonstrate how the estimates vary with consumer demographics and product characteristics.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Supply Chain Analytics</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-1403</td>
<td>Supply Chain Network and Systematic Risk</td>
</tr>
<tr>
<td>Jing Wu, Student, University of Chicago, United States</td>
<td></td>
</tr>
<tr>
<td>John Birge, Professor, University of Chicago, United States</td>
<td></td>
</tr>
<tr>
<td>The structure of supply chain networks impacts firm’s performance through direct effects from shocks to linked firms as well as indirect effects from systematic risk exposure across the entire network. We discuss a model of network formation in this context and its risk implications for firms’ supply chain.</td>
<td></td>
</tr>
</tbody>
</table>
**Conveying Demand Information in Serial Supply Chains with Capacity Limits**

*Chair(s):* Kyle Cattani

*Track: Stochastic Models*

*Saturday, 03:15 PM - 04:45 PM, Parlor 274*

*Roman Kapuscinski, Professor, University of Michigan Ann Arbor, United States*

*Rodney Parker, Associate Professor, University of Chicago, United States*

We construct an inventory management mechanism in capacitated serial multi-echelon systems which uses local knowledge only. We demonstrate that this mechanism can replicate the known optimal and equilibrium policies for these systems; sufficient information about the market demand is conveyed through the orders, despite the demand being censored by capacity.

**Sustainable Supplier Management and Absorptive Capacity: A Multi-Case Study**

*Chair(s):* Madeleine Pullman, Professor, Portland State University, United States

*Anna Land, Student, University of Kassel, Germany*

*Stefan Seuring, Professor, University of Kassel, Germany*

We determine the optimal per-unit emissions and price for a product in order to maximize a firm's profit under carbon tax and carbon cap policies. We also consider the impacts of carbon emissions and price-sensitive exponential demand, with production cost being a decreasing function in per-unit emissions. We derive analytical insights for firms and regulators.

**Market Reactions to LEED Certification**

*Chair(s):* Leke Ogunranti

*Track: Environmental Operations Management*

*Saturday, 03:15 PM - 04:45 PM, Camelia*

*Leke Ogunranti, Student, Drexel University, United States*

We analyze the shareholder value effects of LEED certification by measuring the stock market reactions associated with announcements of LEED certification. We examine the market's reaction to three subcategories of LEED certification: intent for certification, certification, and post-certification.

**A Conceptual Framework for the Implementation of Sustainability in Business Processes**

*Chair(s):* Zhasmina Tacheva

*Track: Environmental Operations Management*

*Saturday, 03:15 PM - 04:45 PM, Dogwood*

*Bruno Gallotta, PhD Researcher, University of Derby, United Kingdom*

*Jose Arturo Garza-Reyes, Reader in Supply Chain Management, University of Derby, United Kingdom*

*Anthony Anosike, Senior Lecturer, University of Derby, United Kingdom*

*Ming K Lim, Professor of Supply Chain and Logistics Operations, University of Derby, United Kingdom*

*Ian Roberts, Head of Derby Business School, University of Derby, United Kingdom*

We aim to provide a complete solution to achieve true sustainability in business processes by evaluating all the relevant aspects, providing a conceptual framework with a case study to simulate scenarios of potential applications. We discuss the simulation results of different aspects with which organizations struggle to succeed in implementation.

**An Integrated, Multi-Echelon Supply Chain Production-Distribution Planning Model with CO2Emission Consideration**

*Chair(s):* Leke Ogunranti

*Track: Environmental Operations Management*

*Saturday, 03:15 PM - 04:45 PM, Camelia*

*Leke Ogunranti, Student, Drexel University, United States*

In this paper, we propose a mixed integral linear program (MILP) model for supply chain network design which focuses on selecting the appropriate location to build a warehouse/distribution center, while deciding on the production and distribution of the product with CO2 emission consideration.

**Reverse-Oriented Supply Chain Option Contract Coordination Study Considering Environmental Preference**

*Chair(s):* Madeleine Pullman, Professor, Portland State University, United States

*Anna Land, Student, University of Kassel, Germany*

*Stefan Seuring, Professor, University of Kassel, Germany*

We examine the role of environmental preference factors on traditional supply chain option contracts, and analyze their influence on option pricing. We study a reverse-oriented leading electronics retailer's decision mechanism and decision-making processes.
### 065-1067  Reliability Or Epidemiology? Developing Stress Tests for Authentic Inventory Networks
Natalie Simpson, Associate Professor, Suny At Buffalo, United States  
Zhasmina Tacheva, Student, Suny At Buffalo, United States  
Ta-Wei Kao, Student, Suny At Buffalo, United States  
Increasing complexity in modern supply relationships has raised concern over system-wide loss of resilience, although the literature lacks definitive measures to track this issue. We employ stochastic models from two different domains to assess their utility in monitoring the relative vulnerabilities of existing inventory networks in several different industries.

### 065-0517  A Two-Period Newsvendor Problem with Cancelation and Expediting Costs
Kyle Cattani, Associate Professor, Indiana University, United States  
Gregory DeYong, Assistant Professor, Southern Illinois University Carbondale, United States  
We find closed-form solutions for the optimal preliminary and revised orders in a two-period newsvendor problem where demand comes from one of N general distributions. At the beginning of the second period, the distribution is known and the preliminary order may be adjusted by incurring expediting or cancelation costs.

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Panels, Tutorials, Meetings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair(s): Rachna Shah</td>
<td></td>
</tr>
</tbody>
</table>

### 065-2068  Doctoral Consortium 3
Rachna Shah, Associate Professor, University of Minnesota, United States  
Only those doctoral students who have registered for this session are invited to attend. The purpose of the POMS Doctoral Consortium is to help doctoral students maximize their chances of having a successful academic career in our globally competitive environment.

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Panels, Tutorials, Meetings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair(s): George Shanthikumar</td>
<td></td>
</tr>
</tbody>
</table>

### 065-2051  Prescriptive Empirical Operations Management (Tutorial)
George Shanthikumar, Professor, Purdue University, United States  
We provide a framework for prescriptive empirical modeling with specific attention to overcoming structural and statistical errors. We illustrate how data driven modeling using data mining and econometric modeling with machine learning can be used. Data integrated modeling will be demonstrated with operational statistics and objective operational learning.

### 065-2088  Data Driven Research in Operations Management
David Simchi-Levi, Professor, Massachusetts Institute of Technology, United States  
In this talk we show how data-driven research fosters the development of new engineering and scientific methods that explain, predict, and change behavior.

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Service Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair(s): Tonny Rodrigues</td>
<td></td>
</tr>
</tbody>
</table>

### 065-1148  Quality Tools for Service Companies: A Systematic Literature Review
Ana Honda, Student, University of Sã£o Paulo, Brazil  
Vitor Zanetti Bernardo, Student, University of Sã£o Paulo, Brazil  
Mateus Gerolamo, Assistant Professor, University of Sao Paulo, Brazil  
Mark Davis, Professor, Bentley University, United States  
We conducted a systematic literature review (SLR) in order to study Quality Tools and Techniques applied in the management of service companies. We determined which ones are the most common in each sub sector and if they really bring benefits to the company.

### 065-0694  Trust and Commitment: Relevant Constructs in the Formation of Partnerships.
Mark Tunu, Student, Universidade Municipal de SãO Caetano do Sul, Brazil  
Milton Farina, Student, Universidade Municipal de SãO Caetano do Sul, Brazil  
Davis Alves, Student, Universidade Municipal de SãO Caetano do Sul, Brazil  
We examine the value of two constructs in relationships from the perspective of partnership between a corporate travel agency and its main suppliers.

### 065-0695  Collaborative Experiences: What Corporate Travelers Say About Travel Suppliers.
Mark Tunu, Student, Universidade Municipal de SãO Caetano do Sul, Brazil  
We show, through qualitative research, what are the views and contributions of the travel customers regarding the services provided by corporate travel suppliers.

### 065-0214  They Do Not Want to Comply with the Warranty! the Influence of Technical Assistance on Consumer Satisfaction
Tonny Rodrigues, Associate Professor, COPPEAD Graduate Business School / Federal University of Rio de Janeiro, Brazil  
Keully Carvalho, Student, Faculdade Santo Agostinho, Brazil  
Jaime Silva, Student, Faculdade Santo Agostinho, Brazil  
Aílila Lira, Associate Professor, Universidade Paulista - Unip, Brazil  
We employ stochastic models from two different domains to assess their utility in monitoring the relative vulnerabilities of existing inventory networks in several different industries.
This research aims to analyze the influence of technical assistance in the satisfaction of consumers of a steel industry. The results indicate that flaws in operations management of technical assistance lead to customer dissatisfaction. The main factors found were non-compliance with delivery dates and product warranty.

065-0442  Effects of Demand Uncertainty and Production Lead Time on Product Quality and Firm Profitability
Baoqiu Jiang, Assistant Professor, Washington University St Louis, United States
Lin Tian, Student, Fudan University, China
We show that improvements in the supplier's lead time or JIT production capacity have non-monotonic effects on product quality and the supplier may have no incentive to improve its lead time or JIT capacity even if it is costless to do so, unless it can keep such improvements secret from the retailer.

065-0457  Unbundling of Ancillary Service: How Does Price Discrimination of Main Service Matter?
Yao Cui, Assistant Professor, Cornell University, United States
Izak Duenyas, Professor, University of Michigan Ann Arbor, United States
Ozge Sahin, Associate Professor, Johns Hopkins University, United States
We consider a setting where the firm sells a main service and an ancillary service. We study how the firm's ability to charge discriminatory main service prices affects the decision of whether to separately charge for the ancillary service, both for the firm and for the industry.

065-0466  Supplier Encroachment with Private Selling Cost Information
Huqi Guan, Student, University of Miami, United States
Zhabin (Ben) Yang, Assistant Professor, University of Oregon, United States
Haresh Gurnani, Professor, Wake Forest University, United States
We study channel encroachment by a supplier privately informed of its cost of direct selling. The supplier's direct selling capability may positively or negatively affect the supplier and buyer's profits due to signaling. Both firms and consumers may be worse off from the supplier's acquisition of private cost information.

065-0564  Selling to Strategic Customers: When There Is a Non-Deceptive Counterfeiter
Hubert Pun, Assistant Professor, University of Western Ontario, Canada
Gregory DeYong, Assistant Professor, Southern Illinois University Carbondale, United States
Using a two-period game, we model decisions of both a manufacturer and a counterfeiter when the customers are forward-looking strategy. We find that the manufacturer may reduce both the quality and price of the genuine product to eliminate the threat of a counterfeiter.

065-0740  Optimal Rollover and Pricing Strategy in the Presence of Competitive Follower and Strategic Consumers
Jiang Wang, Student, Peking University, China
Liuhua Chen, Professor, Peking University, China
Tianxiao Gong, Student, Peking University, China
Zhaowei Hao, Student, Peking University, China
The innovating firm is facing competition not only from its own products but also from a potential product from a competitive follower. In a two-period-game model, we characterize the rational expectations equilibrium, where we show the market segmentations and the firm's optimal pricing and rollover strategy.

065-0741  Optimal Advance Selling Strategy for a Firm with Capital Constraint
Zhaowei Hao, Student, Peking University, China
Liuhua Chen, Professor, Peking University, China
Wei Wang, Student, Peking University, China
Tianxiao Gong, Student, Peking University, China
We study the advance selling strategy for a start-up firm with capital constraint. The start-up can raise funds by inducing buyers to pay early, thus relieving its capital constraint. Considering consumers' strategic behavior, we obtain the firm's optimal pricing strategy and examine the benefit of the advance selling strategy.

065-1878  Advance Selling with Quality Uncertainty and Consumer Heterogeneity
Zhiyuan Chen, Lecturer, Wuhan University, China
Xu Guan, Student, Wuhan University, China
We investigate a seller's equilibrium advance selling strategy to a group of consumers who are heterogeneous in their preferences to the product quality and the awareness of the advance sales option. We show that advance selling can be dysfunctional under dynamic pricing scheme and price commitment scheme.
<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Chair(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-0445</td>
<td>Integrative Practices in Supply Chains: Building Relationships for Competitiveness in Dynamic Environments</td>
<td>Olatunde Durowoju</td>
</tr>
<tr>
<td>065-0770</td>
<td>Measuring Supply Chain Performance in Indian Automotive Industry: A PLS Approach</td>
<td>Vidyaranya Gargeya</td>
</tr>
<tr>
<td>065-1039</td>
<td>Skills of Logistics and Supply Chain Management Professionals: A Survey</td>
<td>Vidyaranya Gargeya, Professor, University of North Carolina Greensboro, United States</td>
</tr>
<tr>
<td>065-1252</td>
<td>Reference Process Model for Disaster Response Operations</td>
<td>Tharcisio Fontainha, Student, Pontificia Universidade Catolica Do Rio De Janeiro- Puc Rio, Brazil</td>
</tr>
<tr>
<td>065-1449</td>
<td>Stakeholder Relationships in Disaster Operations: Stakeholder Satisfaction and Contribution Perspectives</td>
<td>Adriana Leiras, Assistant Professor, Pontificia Universidade Catolica Do Rio De Janeiro- Puc Rio, Brazil</td>
</tr>
<tr>
<td>065-1631</td>
<td>Effectiveness of Critical Success Factor (CSFs) in Electronic Supply Chain Management (E-SCM) for Thai Manufacturers</td>
<td>Vichayanan Rattanawiboonsom, Assistant Professor, Naresuan University, Thailand</td>
</tr>
</tbody>
</table>

**Session: Optimizing Supply Chain Performance**

**Chair(s):** Adriana Leiras

**Session: Strategies for Humanitarian Operations**

**Chair(s):** Olatunde Durowoju

**Session: Supply Chain Coordination (1)**

**Chair(s):** Murat Kristal, Associate Professor, York University, Canada
065-0650  Synergy of Improvement Strategies in Disruptive and Non-Disruptive Supply Chains  
Zhankun Sun, Marco Bijvank, University of Calgary, Canada

We examine the effect of structural improvement in the supply chain and how the benefit of any current information sharing strategy might be affected. This understanding is key to making sustainable improvements to the supply chain either with a short term view or from a long term perspective.

065-0739  A Two-Echelon Supply Chain Coordination through Bargaining Models Using Common Replenishment Epochs  
José Velásquez, Fidel Torres, Universidad De Los Andes, Colombia

We present a new approach to an inventory management problem, based on common replenishment epochs. The approach, developed in five linear modeling programs, analyzes from different perspectives the position of the vendor/buyer under deterministic and dynamic demand. Finally, a numerical study is conducted to evaluate the proposed coordinating strategies.

065-0030  A Natural Randomized Control Experiment on the Impact of Care Discontinuity  
Ana Cecilia Zenteno Langle, Kimia Ghobadi, Andrew Johnston, Retsef Levi, Walter O'Donnell, Massachusetts General Hospital, United States

Functional heterogeneity, distributed care models, and consistent growth in demand have led to a congested system in the Department of Medicine at MGH. We use a natural randomized control setting to model and quantify the impact of care team discontinuity on unnecessary delays in patients' progression through the hospital.

065-1327  Scheduling Medical Residents with Conflicting Requests for Time Off  
Brian Lemay, Amy Cohn, Marina Epelman, University of Michigan, United States

When scheduling healthcare providers, it is frequently not possible to satisfy every scheduling request. Multi-criteria objective functions provide one method for overcoming this challenge, but can result in undesirable schedules. We discuss an alternative method for resolving conflicting scheduling requests for a resident scheduling problem at a major teaching hospital.

065-1583  What Are the Best Admission Policies in a Busy ICU?  
Fernanda Bravo, Michael McManus, University of California, United States

We study admission policies for complex patients in the ICU of a pediatric academic-hospital. We consider four different patient types: medical, emergency, surgical, and international-elective, each with different needs. The ICU must remain available for emergencies before accommodating elective admissions. Our policies depend on current ICU status and future patients' arrivals.

065-1747  Quantifying, Predicting, and Allocating Case Managers' Workloads  
Jason Stuck, Retsef Levi, Walter O'Donnell, Massachusetts General Hospital, United States

Inpatient case managers develop and coordinate discharge plans. The associated workload can vary widely depending on patients' needs. We develop a workload metric, build a predictive model to identify high-workload patients, and propose staffing policies that address case managers' workload variability.

065-1463  Percentile Optimization in Multi-Class Queueing Systems with Parameter Ambiguity  
Austin Bren, Soroush Saghafian, Harvard University, United States

In multi-class queueing systems that experience system ambiguity through unknown service rate parameters, we incorporate robustness to policies by applying percentile optimization, allowing for the expression of a controller's optimism level and utilizing incoming data to learn about the system. We apply this technique to a hospital emergency department.

065-1266  Understanding and Reducing Emergency Care Waiting Times  
Martin Land, Taco Van der Vaart, University of Groningen, Netherlands

Earlier work has shown the relevance of a dynamic perspective in analyzing emergency care waiting times. Since queues build up over time, quick responses to increasing arrival rates are key to reducing waiting times. We explore the role of responsiveness in multiple cases with mixed qualitative and quantitative methods.

065-0874  Wait Time Announcements at Hospital Emergency Departments  
Marco Bijvank, Zhankun Sun, University of Calgary, Canada

We present a model to evaluate the effects of wait time announcements in an emergency department. We find that larger announcements may have mixed results, with a small benefit to patients receiving less information and higher waiting times for longer stay patients.
We accurately predict the state-dependent wait times at emergency departments based on a busy-period analysis for a multi-class, multi-server priority queue with delay feedback. We illustrate the robustness and impact of the predictor with a case study at the four major hospitals in the Calgary area.

**065-1599** Resource Pooling and Flexibility to Improve Emergency Department Boarding

Aaron Ratcliffe, Assistant Professor, University of North Carolina Greensboro, United States

ED boarding, resulting from a misalignment of bed unit requests and discharges, worsens health outcomes and compromises patient care. We use a fluid queueing network approximation to examine how to improve ED boarding by pooling and jointly managing inpatient bed resources and staff.

**330** Sunday, 08:00 AM - 09:30 AM, Salon 8  
**Session:** Healthcare Advances in Pharmacy and Wearable Technology  
**Track:** Healthcare Operations Management  
**Chair(s):** Fariborz Partovi

**065-0193** Pharmaceutical Industry Review I: Context, Trends and Drivers

Tomás Harrington, Associate Professor, Cambrige University, United Kingdom

Emerging therapies, global regulation, and consumer trends are driving a need for great change in pharma operations and across the industry as a whole. In part I of an extensive review of the sector, we explore the drugs/opportunities for 'alternative' manufacturing paradigms, future supply networks, and novel business model development.

**065-0468** Prioritization of Pharmaceutical Project Phases with Respect to Time and Cost Dimensions

Jigeesh Nasina, Professor, IBS Hyderabad (FAC MGMT)-IFHE University, India  
Sai Nandeswara Rao Nallam, CTO Projects, Dr. Reddy’s Laboratories Ltd., CTO Unit-III, IDA Bollarum, Hyderabad, India

We administrated two surveys at four Indian pharmaceutical organizations. One compared the importance of time and cost dimensions of projects. The other prioritized project phases. We find that time is more important than cost, and that the execution phase is the highest priority, followed by monitoring and control.

**332** Sunday, 08:00 AM - 09:30 AM, Lanai  
**Session:** Strategic Decision Making and Customer Behavior in Supply Chains  
**Track:** Behavior in Operations Management  
**Chair(s):** Pelin Pekgun

**065-0115** The Blessing of Bounded Rationality in Distribution Channels

Tony Haitao Cui, Associate Professor, University of Minnesota, United States  
Yusong Wang, Associate Professor, Fudan University, China

We incorporate bounded rationality into the conventional dyadic channel to investigate how bounded rationality may affect the interactions between the manufacturer and the retailer. Surprisingly, we found that bounded rationality, a force that drives firms away from optimal profit maximization behaviors, may be a blessing for a channel.

**065-0165** Effect of Capacity and Flexibility Constraints on Bullwhip Effect in Supply Chains

Arunachalam Narayanan, Assistant Professor, University of Houston, United States  
Alan Mackelparg, Associate Professor, Georgia Southern University, United States  
Manoj Malhotra, Professor, University of North Carolina, United States

Finite system capacity is shown to dampen bullwhip effect in theoretical framework. Yet, studies have found two-thirds of the firms experience bullwhip effect. Through a series of laboratory experiments we evaluate the impact of varying flexibility and capacity-restricted ordering policies on the bullwhip effect.

**065-1196** Behavioral Anomalies in Consumer Wait-Or-Buy Decisions and the Implications for Markdown Management

Manel Baucells, Professor, University of Virginia, United States  
Nikolay Osadchyi, Assistant Professor, Emory University, United States  
Anton Ovchinnikov, Associate Professor, Queens University, Canada

A decision to buy at a tag price or wait for a possible markdown involves a trade-off between the value, delay, risk and markdown magnitude. We build a model that accounts for three well-known behavioral anomalies along these dimensions and study its implications for pricing.

**333** Sunday, 08:00 AM - 09:30 AM, Veranda  
**Session:** Retail Store Execution  
**Track:** Retail Operations Management  
**Chair(s):** Nicole DeHoratius

**065-0093** What Products Should a Retailer Place on End-of-Aisle Displays?

Olga Pak, Student, University of South Carolina, United States  
Mark Ferguson, Professor, University of South Carolina, United States  
Mariana Nicolae, Assistant Professor, Eastern Michigan University, United States

In this joint work with Oracle Retail, we provide an empirical estimation procedure and an assortment optimization model for determining what products a retailer should promote on its end-of-aisle displays. We use an aggregate dataset of multiple retailers across the U.S. to estimate our model's parameters.

**065-0596** Assortment Planning for a Two-Sided Market

Ying Cao, Student, University of Texas Dallas, United States  
Dorothee Honhon, Associate Professor, University of Texas Dallas, United States
We consider a firm that makes product assortment decisions in the face of a two-sided market: it receives revenues from customers and advertisers. We obtain structural properties of the optimal assortment and quantify the loss in revenue from ignoring one side of the market.

### 065-0887 Estimating the Heteroscedastic Exponential Choice Model

Yildiz Alptekinoglu, Penn State University University Park, United States
John Semple, Southern Methodist University, United States

We develop analytical properties of the Heteroscedastic Exponential Choice (HEC) model and demonstrate its estimation using a household panel data of grocery purchases. The HEC model compares quite favorably to MNL in out-of-sample prediction.

### 065-1949 Revisiting Common Assumptions in Retail Promotion Execution

Daniel Steeneck, Lecturer, Center for Transportation and Logistics, United States
Fredrik Eng-Larsson, Lecturer, Massachusetts Institute of Technology, United States
Francisco Jauffred, Lecturer, Center for Transportation and Logistics, United States
Chris Caplice, Professor, Center for Transportation and Logistics, United States

Retail promotion research and practice often make seemingly reasonable assumptions regarding consumer demand, forecast updating, and in-store operations. Using data from a large retailer, we evaluate the validity of some common assumptions, revise these assumptions, and propose methods for optimizing promotion execution under these revised assumptions.

### 334 Sunday, 08:00 AM - 09:30 AM, Rose

**Session:** Retail Supply Chain Management

**Chair(s):** He Huang

### 065-0315 The Impact of Supply Chain Contracts on Inventory Waste: Inference from Packaged Food Products

Min Choi, Student, Arizona State University Tempe, United States
Elliot Rabinovich, Professor, Arizona State University Tempe, United States
Timothy Richards, Professor, Arizona State University Tempe, United States

Using data from a major bakery supplier, we estimate the impact of supply chain contracts on inventory waste. We find a higher level of waste under SBT contracts, seemingly driven by retailers' moral hazard. Our findings call for careful designs of supply chain contracts to improve sustainability.

### 065-1766 Evaluating Allocation Performance of Fashion Retail Supply Chain through Dynamic Network DEA

He Huang, Student, Donghua University, China
Shanling Li, Professor, McGill University, Canada
Yu Yu, Student, Hohai University, China

In the fashion industry, demand uncertainty makes developing replenishment and allocation policies extremely difficult. We develop a dynamic network DEA model to evaluate replenishment/allocation performance of an apparel company. The model provides insights into initial and future period allocation and replenishment decisions.

### 065-1988 Mapping Customer Expectations from Online and Offline Fresh Food Retail Supply Chains

Rose Cester, Student, National Institute of Industrial Engineering, Mumbai, India
Vivekanand Khanapur, Associate Professor, National Institute of Industrial Engineering, Mumbai, India
Karuna Jain, Professor, National Institute of Industrial Engineering, Mumbai, India

We identify the variables that impact customer expectations towards the organized fresh food retail sector in India. Using a case-based approach, we study the initiatives and projects that are most likely to impact the previously identified variables and improve customer expectations.

### 335 Sunday, 08:00 AM - 09:30 AM, Edelweiss

**Session:** Vehicle Routing in Complex Environments

**Chair(s):** Neil Geismar

### 065-0135 Import and Distribution Planning for Food Safety: Electron Beam Facility Location Models

Yiwei Huang, Student, Texas A&M University College Station, United States
Neil Geismar, Associate Professor, Texas A&M University College Station, United States
Suresh Pillai, Professor, Texas A&M University College Station, United States
Chelliah Sriskandarajah, Professor, Texas A&M University College Station, United States

This study helps the U.S. and Mexican governments select the most cost-efficient locations for Electron Beam (eBeam) irradiation facilities. We then derive the optimal route for importing fresh fruits and vegetables into the United States through the Texas-Mexico border considering prohibited movement areas and queuing delay at eBeam facilities.

### 065-0914 Online and Open Vehicle Routing Problem with Split Deliveries

Ibrahim Capar, Bowling Green State University, United States
Burcu Keskin, University of Alabama Tuscaloosa, United States

Online and open VRP with split deliveries is a common problem for shippers that use common carriers. We develop an asymptotical-optimality-based reduction technique and solve a real-life problem within reasonable times. Combining this technique with various dispatch policies, we demonstrate over eight percent savings compared to the real-life benchmark.

### 065-1057 Scheduling in a Competitive Environment

Alejandro Lamas, Assistant Professor, NEOMA Business School, France
Philippe Chevalier, Professor, UCLouvain, Belgium
We study simultaneous pricing and operations planning when two competitors face price sensitive demands. We develop an efficient algorithm to compute the Nash Equilibrium between two competitive firms in order to determine the resulting pricing and production schedule when operations are modeled as a lot sizing problem.

**065-1305** Service Reliability in the Vehicle Routing and Time Window Assignment Problem with Stochastic Travel Times

Panagiotis Repoussis, Assistant Professor, Stevens Institute of Technology, United States
Varias Anastasios, Student, Athens Univ of Econ & Bus, Greece
Christos Tarantilis, Professor, Athens Univ of Econ & Bus, Greece

We address combined vehicle routing problems with self-imposed time windows, stochastic travel times, and customer service reliability constraints. A two-stage LNS metaheuristic framework is proposed. The first stage minimizes the routing cost of the master routing problem, while the second optimally solves the subordinate time window assignment sub-problems.

**336**

**Sunday, 08:00 AM - 09:30 AM, Fuchsia**

**Session:** Product and Process Development

**Chair(s):** Shane Schvaneveldt

**Track:** Empirical Research in Operations Management

**065-1224** Serviceability Practices and Their Impact on Operational Performance: An Empirical Analysis

Erialdi Syahrial, Associate Professor, Keio University, Japan
Hideo Suzuki, Professor, Keio University, Japan
Shane Schvaneveldt, Professor, Weber State University, United States

We describe a framework that links management practices, design for serviceability practices, and operational performance in after-sales service. The developed structural model was tested using managerial survey data, and the results provide strong empirical support for the positive impact of serviceability practices on performance.

**065-0540** Product life cycle as a framework for operations planning: an empirical study

Abdulkareem Awwad, Associate Professor, Qatar University, Qatar

This empirical study is carried out to identify operations and marketing managers' perceptions in Jordanian manufacturing industry to describe the role of product life cycle in operations planning. The results provide a strong insight into product life cycle theory, which plays a major role in operations planning.

**065-0765** Product Architecture Design: The Role of Supply Chain Configuration

John Carr, Student, Cranfield University, United Kingdom

Decisions made at the product concept design stage later impact the alignment of supply chain configuration with the products' physical architecture. We use case studies across the consumer appliance, medical device, automotive, and aerospace sectors to understand how feedback and feed-forward anticipatory control and concurrent engineering affect this alignment.

**337**

**Sunday, 08:00 AM - 09:30 AM, Gardenia**

**Session:** Panel: Circular Economy and Closed Loop Supply Chains: Does Industry Matter?

**Chair(s):** Hale Kaynak

**Track:** Closed-Loop Supply Chains

**065-2049** Panel: Circular Economy and Closed Loop Supply Chains: Does Industry Matter?

Hale Kaynak, Professor, University of Texas Rio Grande Valley, United States
Mahour Parast, Assistant Professor, North Carolina A&T State University, United States
Gokce Esenduran, Assistant Professor, Ohio State University, United States
Cheon Kwanheui, , ,

There is growing attention to circular economy in the field of sustainable supply chains. This panel will discuss how industry characteristics affect the transition to circular economy and implementation of closed-loop supply chain practices. It will also reflect on the implications of these effects for research and practice.

**338**

**Sunday, 08:00 AM - 09:30 AM, Hibiscus**

**Session:** Behavior and Logistics

**Chair(s):** Birasnav Muthuraj

**Track:** Behavior in Operations Management

**065-0781** Collaborative Planning In Logistics Service Providers Networks

Nienke Hofstra, Student, Vrije Universiteit Amsterdam, Netherlands
Wout Dullaert, Professor, Vrije Universiteit Amsterdam, Netherlands
Sander De Leeuw, Associate Professor, Vrije Universiteit Amsterdam, Netherlands
Eirini Spiiliotopoulou, Assistant Professor, Vrije Universiteit Amsterdam, Netherlands

Little is known about the decision-behavior of transport planners in LSPs. Using case research, we explain how logistics attributes (e.g. cost, speed) and underlying behavioral factors (emotional algorithms) influence collaborative behavior in transport planning. Future efforts to incorporate human behavior in freight models should take these behavioral factors into account.

**065-1352** Drivers of Traffic Congestion Externality: Insights from the Freeway Game

Francois Giraud-Carrier, Assistant Professor, University of Illinois at Springfield, United States
Atul Agarwal, Professor, University of Illinois at Springfield, United States

Using The Freeway Game (www.thefreewaygame.com), we study the behavior of commuters in a simulated transportation system with congestion. We compare experimental results to the mixed strategy Nash equilibria predicted by game theory, and derive insights for the mitigation of externality-generated problems such as congestion.

**065-1732** The Influence of Education and Experience Upon Contextual and Task Performance in Warehouse Operations

Allen Miller, Student, Air Force Institute of Technology, United States
Jeffrey Ogden, Associate Professor, Air Force Institute of Technology, United States
We believe worker-performance may be affected by the individual's knowledge of why and where they fit into a larger system, defined as mission clarity. We conduct a controlled experiment to discern how education, experiences and subject characteristics impact mission clarity and subsequently contextual and task performance in a pick-and-pack operation.

**065-1792**  Leadership Behaviors and Supplier Development Practices: The Role of Manufacturing Flexibility  
Birasnav Muthuraj, Assistant Professor, New York Institute of Technology, United States

This study examines the impacts of leadership behaviors on supplier development practices to predict operational performance. In addition, this study investigates at what extent the above relationships tend to change in the context of firms operating in low and high flexible environment.

**339**  
**Sunday, 08:00 AM - 09:30 AM**  
**Track:** Socially Responsible Operations

**Session:** Operational Challenges of Socially Responsible Organizations

**Chair(s):** Ioannis Bellos

**065-0681**  An Empirical Investigation of Emissions Reductions under Changing Assessments of Hazard  
Wayne Fu, Student, Georgia Institute of Technology, United States  
Basak Kalkanci, Assistant Professor, Georgia Institute of Technology, United States  
Ravi Subramanian, Associate Professor, Georgia Institute of Technology, United States

Governmental organizations such as the CDC provide extensive public information on potential hazards of industrial chemicals. We investigate the longitudinal relationship between reductions in facility-level chemical emissions and changes in the chemical’s hazard assessments. We also examine the impact of operational leanness on chemical emissions.

**065-1248**  Change Management in Operations of Humanitarian Organizations  
Bublu Thakur-Weigold, Senior Lecturer, Swiss Federal Institute of Technology Zurich, Switzerland  
Maria Besiou, Associate Professor, Kuehne Logistics University, Germany  
Stephan Wagner, Professor, Swiss Federal Institute of Technology Zurich, Switzerland

This paper studies information flow in a partly-decentralized humanitarian organization. Preliminary data confirmed that HQ and Field suffered from low visibility of the other's state, decisions and motives. Our experiment with two field offices and the HQ of a Swiss NGO tested how communications training impacted change.

**065-1294**  Optimal Allocation Rules with Waste Considerations  
Sara Rezaee Vessal, Student, HEC Paris, France  
Sam Affaki, Assistant Professor, HEC Paris, France  
Dimitrios Andritsos, Assistant Professor, HEC Paris, France

We study capacity allocation of a scarce and perishable product among stockout-averse retailers that face stochastic demand. We focus on two commonly practiced allocation mechanisms and using a dynamic model characterize the conditions under which each allocation mechanism performs superior from a waste and profit point of view.

**340**  
**Sunday, 08:00 AM - 09:30 AM**  
**Track:** Information in Operations Management

**Session:** IT Management Issues in Healthcare

**Chair(s):** Emre Demirezen

**065-0393**  Bundled Payments for Healthcare Services: A Framework for Analyzing the Healthcare Provider Selection Problem  
Seokjun Youn, Student, Texas A&M University College Station, United States  
Anupam Agrawal, Associate Professor, Texas A&M University College Station, United States  
Subodha Kumar, Professor, Texas A&M University College Station, United States  
Chelliah Sriskandarajah, Professor, Texas A&M University College Station, United States

Identifying competitive healthcare providers is an important issue for the successful operation of bundled payments. We develop a framework that aims to select better providers than the existing method while balancing cost reduction, quality of care, and efficiency measures. We evaluate the impact of design issues based on a real dataset.

**065-1060**  A Simulation Algorithm to Staff for Time-Varying Arrivals and Multiple Customer Classes  
Leon Cui, Assistant Professor, Binghamton University, United States  
Ozlem Yildiz, Student, University of Rochester, United States  
Tolga Tuzcan, Associate Professor, London Business School, United Kingdom

We propose a data-driven heuristic algorithm to find the minimum staffing level required in a queueing system with time-varying arrivals and multiple customer classes, given a service level criterion for each customer class. Its validity is supported by results from the hospital, and by numerical experiments.

**065-1212**  Role of Alternative Payment Models in Adoption and Value of Health Information Exchanges (HIEs)  
Mehmet Ayyaci, Assistant Professor, University of Texas Dallas, United States  
Huseyin Cavusoglu, Associate Professor, University of Texas Dallas, United States  
Srinivasan Raghunathan, Professor, University of Texas Dallas, United States
Although payment models and HIEs are the cornerstones of the ongoing reform, insights regarding the relationships among a payment model, providers’ incentives to adopt HIEs, and the value of HIEs have not been studied. We explore the incentive alignment problem for electronic sharing of health information under various payment models.

065-1553 Arbitrageur Strategy in Multichannel Ecommerce Environment
Hemang Subramanian, Professor, Florida International University, United States
Eric Overby, Assistant Professor, Georgia Institute of Technology, United States
Jonathan Clarke, Associate Professor, Georgia Institute of Technology, United States

In a multichannel ecommerce environment, where traders can buy and sell the same (or similar) goods, channel heterogeneity plays an important role in determining market conditions for arbitrage. We study arbitrageur strategies with respect to these multiple channels, and specifically study location and good specialization.

065-2061 Vertical Integration Strategy for Advertising-financed Platforms
Siddhartha Sharma, Student, Carnegie Mellon University, United States
Amit Mehra, Associate Professor, University of Texas Dallas, United States

We probe incentives of an advertising financed platform to vertically integrate with a third party service that it needs to serve its consumers. We find that such incentives dominate when cost of quality of the third party service production is low.

065-1612 Impact of Promoting Free Wi-Fi on Mobile Data Usage: Evidence from a Field Experiment
Karthik Babu Nattamai Kannan, Student, Georgia Institute of Technology, United States
Yu Jeffrey Hu, Associate Professor, Georgia Institute of Technology, United States
Sridhar Narasimhan, Professor, Georgia Institute of Technology, United States

Consumers connect to the internet outside their home via a number of channels such as mobile data and Wi-Fi hotspots. In this study we examine how promoting the free Wi-Fi impacts customer churn and mobile vs. Wi-Fi data usage behavior.

065-1635 E-Commerce in the Manufacturing Supply Chain: An Empirical Analysis
Patricia Angle, Student, Georgia Institute of Technology, United States
Chris Forman, Professor, Georgia Institute of Technology, United States
Kristina McElheran, Assistant Professor, University of Toronto, Canada

We explore the value of information technology on the productivity of manufacturing plants. We find that, on average, e-selling adoption is associated with a 1.4% increase in total factor productivity. However, these returns differ significantly between small and large plants. We explore explanations for this difference.

065-1041 Hospital Quality and Patient Choice: An Empirical Analysis of Mitral Valve Surgery
Guilhua Wang, Student, University of Michigan Ann Arbor, United States
Jun Li, Assistant Professor, University of Michigan Ann Arbor, United States
Wallace Hopp, Professor, University of Michigan Ann Arbor, United States

We document a wide quality gap among 35 hospitals in New York State that perform mitral valve surgery. We then use a discrete choice model to identify major barriers preventing patients from choosing the best quality care. Lastly, we evaluate policies for removing these barriers to enable informed patient choice.

065-1168 Mitigating the Effect of Schedule Dependent No-Shows
Qingxia Kong, Assistant Professor, Universidad Adolfo Ibañez, Chile
Shan Li, Assistant Professor, Baruch College, United States
Nan Liu, Assistant Professor, Columbia University, United States
Chung-Paw Teo, Professor, National University of Singapore, Singapore
Zhenzheng Yan, Student, National University of Singapore, Singapore

We study independent data sets from countries on two continents which identify a significant time-of-day effect on patient arrival probabilities. We deploy a distributionally robust model to find the optimal scheduled arrival times for patients.

065-1177 Appointment Scheduling or Process Improvement for Provider Productivity?
Linda LaGanga, Chief Operating Officer, 1979, United States
Stephen Lawrence, Associate Professor, University of Colorado Boulder, United States

We develop near-optimal appointment schedules with no-shows and overbooking, and compare them with productivity gains determined through analysis of actual appointment data collected before and after a healthcare clinic conducted process improvement activities. The results reveal opportunities for clinics to apply these techniques effectively to increase provider productivity and patients’ access to services.

065-0515 Product Complexity, Network Position, and Product Innovation
Yingchao Lan, Student, Ohio State University, United States
John Gray, Associate Professor, Ohio State University, United States
We investigate how firms manage their network position for better product innovation performances when considering product complexity. Results indicate that product complexity has a curvilinear relationship with product innovation performance which is moderated by firm’s network position.

Workers often report to multiple supervisors at the same time, but little is known about the effects of these work arrangements on worker performance. Empirical findings from an application maintenance services organization suggest that multiple reporting lines can benefit worker performance and that project complexity moderates this relationship.

We study human search behavior to solve combinatorial decision problems in centralized and decentralized coordination settings. We examine how decision-makers alter their exploratory and exploitative search behavior based on the feedback that they receive. A research design that combines NK simulation model with behavioral experiments is used.

We explore environmental impact in four sectors (automotive, pharmaceuticals, aerospace, and food) involving discreet and process production systems in order to understand how and why environmental strategies and actions affect the configuration of supply chains. The research approach includes a case study, supply chain mapping, and environmental impact analysis.

Buying organizations are increasingly exposed to “supplier sustainability risk”, which originates from negative sustainability-related conditions or potential events within their supply base that may provoke harmful stakeholder reactions. A vignette-based experiment has been conducted to investigate the effect of three contextual elements on the buyers’ choice among four risk management strategies.

Recently, several automakers including GM and Toyota have been accused of deliberately hiding safety hazards in their products and delaying product recalls, exposing the public to danger. We investigate how regulators can induce optimal recall decisions from manufacturers who have private information about safety hazards.

Motivated by observing collaborative alliances between competing firms in the context of environmental innovation, we develop an economic model of vertical and horizontal R&D collaboration within and across competing supply chains to identify when and why R&D collaboration occurs. We also examine implications for relevant stakeholders.

We focus on extended producer responsibility schemes to allocate recycling costs of discarded products to producers. We compare individual producer responsibility (IPR) and collective producer responsibility (CPR), and investigate the impact of technology sharing on this comparison.
We study a firm's procurement and selling decisions in a multiclass demand and multisupplier inventory system. We show that optimal procurement is driven by multisourcing and intertemporal substitution, while optimal selling is driven by customer segmentation and intertemporal rationing.

The importance of global sourcing strategies in a supply chain context, few business schools offer courses in Global Sourcing. Culling from an experience base of crafting Global Sourcing courses across different levels, this presentation will highlight and share key design elements for building such a course offering.

We investigate the effect of supply-chain disruption on a firm's decisions to invest in quality and on ordering decisions, when there is a choice between suppliers and a variable rate of knowledge transfer. Our research considers joint decision-making about order allocation and investments in quality in the face of disruption.

We identify and examine the adaptive capabilities of resilient supply chains. The theoretical considerations concerning the issue of adaptation, as an important facet of resiliency, are complemented with the findings of an empirical study conducted in the sample of European supply chains.

Firms experiencing disruption face many immediate recovery concerns as well as a need to address long term capability concerns. Most supply chain risk is focused on mitigation and recovery, overlooking the adaptation of capabilities. Our research examines how firms learn through supply chain disruptions to become more resilient.

Rue La La is an online retailer who offers limited-time discounts on designer apparel. We use machine learning to build a demand prediction model for new products and develop a multi-product price optimization tool. Field experiment results show significant increases in revenue.

Bundling has been widely studied in the literature as a form of price discrimination. We show that it can also be used as a form of price experimentation, and a mixed bundling scheme allows us to quickly learn the customer demand functions without having to change any prices.

To speed recruitment, clinical trials are going global to find patients. While this benefits recruitment efforts, the supply chain is challenged to maintain available drug supply at globally scattered sites for a fixed patient horizon. We provide a new class of multi-echelon inventory models to address this unique challenge.
<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
<th>Chair(s)</th>
<th>Session Time</th>
<th>Track</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-1122</td>
<td>Product Variety and Productivity: Evidence from the North American Beverage Industry</td>
<td>Alan Pritchard, Student, University of Maryland, United States; Xiang Wan, Assistant Professor, Ohio State University, United States; Martin Dresner, Professor, University of Maryland, United States</td>
<td>Sunday, 08:00 AM - 09:30 AM, Camelia</td>
<td>Supply Chain Design for Environment</td>
</tr>
<tr>
<td>065-0335</td>
<td>Economic and Environmental Advantage: Comparing Two Technological Alternatives for Denim Weaving</td>
<td>Ariane Sanches, Student, Universidade Nove De Julho, Brazil; Wagner Lucato, Professor, Universidade Nove De Julho, Brazil; Geraldo Oliveira Neto, Associate Professor, Universidade Nove De Julho, Brazil</td>
<td>Sunday, 08:00 AM - 09:30 AM, Dogwood</td>
<td>Supply Chain Design for Environment; Environmental Operations Management</td>
</tr>
<tr>
<td>065-1552</td>
<td>Effects of Green Stakeholder Orientation and Green Innovation Capability on Firm Performance</td>
<td>Sumin Lee, Student, Yonsei University, Korea, Republic of (South Korea); Soohnhong Min, Professor, Yonsei University, Korea, Republic of (South Korea); Kyeong Soon Kim, Student, Yonsei University, Korea, Republic of (South Korea); Jua Chung, Student, Yonsei University, Korea, Republic of (South Korea)</td>
<td>Sunday, 08:00 AM - 09:30 AM, Parlor 274</td>
<td>Operations Management; Critiques and New Ideas; Emerging Scholars 1</td>
</tr>
<tr>
<td>065-1541</td>
<td>An Innovation and Sustainability Model From an SCM Perspective</td>
<td>Mehmet Yalcin, Student, University of Rhode Island, United States</td>
<td>Sunday, 08:00 AM - 09:30 AM, Parlor 274</td>
<td>Emerging Scholars 1</td>
</tr>
<tr>
<td>065-1097</td>
<td>A Multi-Objective Ranking of POM Journals</td>
<td>Gary Stading, Professor, Texas A&amp;M University - Texarkana, United States; Nezih Altay, Associate Professor, Depaul University, United States</td>
<td>Sunday, 08:00 AM - 09:30 AM, Parlor 274</td>
<td>General/Emerging Topics in Operations Management</td>
</tr>
<tr>
<td>065-1977</td>
<td>Sorting Maintenance Types By Multi-Criteria Analysis to Clarify Maintenance Concepts in POM</td>
<td>Flavio Trojan, Associate Professor, Federal University of Technology, Brazil; Rui Marçal, Professor, Pontifical Catholic University of Parana, Brazil</td>
<td>Sunday, 08:00 AM - 09:30 AM, Parlor 274</td>
<td>Emerging Scholars 1</td>
</tr>
<tr>
<td>065-1632</td>
<td>An Investigation of Operational Platforms: Beyond Networks, Toward Applications &amp; Analytics</td>
<td>Kayvan Lavassani, Assistant Professor, North Carolina Central University, United States; Bahar Movahedi, Assistant Professor, North Carolina Central University, United States</td>
<td>Sunday, 08:00 AM - 09:30 AM, Parlor 274</td>
<td>Emerging Scholars 1</td>
</tr>
</tbody>
</table>
Several factors have significantly affected contemporary management practices including complex data, artificial intelligence, and globalization, just to name a few. We investigate the evolution of business process operations with particular emphasis on the roles of social networks, analytics, and the shift from product to service in business process management.

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Session Details</th>
<th>Track: Service Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-0156</td>
<td>The Influence of Lean Construction in Construction Companies’ Strategies: a Systematic Literature Review</td>
<td>Harry Barton</td>
</tr>
<tr>
<td>065-0660</td>
<td>Lean Implementation and Sustainability: A Classification Model of the Main Organizational Barriers and Enabler</td>
<td>Higor Leite, Lecture, Loughborough University, United Kingdom</td>
</tr>
<tr>
<td>065-1413</td>
<td>Contributions of Continuous Improvement Workshop Method in a Telecom Company</td>
<td>Sergio Dos Santos Neto, Associate Professor, CEETEPS - Centro Estadual de Educação Tecnológica Paula Souza, Brazil</td>
</tr>
<tr>
<td>065-0103</td>
<td>An Assessment of the Impact of Lean Interventions within the UK Police Service</td>
<td>Harry Barton, Professor, Nottingham Trent University, United Kingdom</td>
</tr>
</tbody>
</table>

This article examines value chain repositioning with bottleneck solving. It aims to improve company internal processes by repositioning the change as continuous improvement. It's a case report of a telecom company in Brazil.

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Session Details</th>
<th>Track: Humanitarian Operations and Crisis Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-1677</td>
<td>Minimizing Victim Deprivation via Dynamic Resource Allocation for Sorting of In-Kind Donations</td>
<td>Nazanin Morshedlou</td>
</tr>
<tr>
<td>065-1106</td>
<td>Optimal Rescue and Field Medical Teams Deployment in Mass-Casualty Incidents</td>
<td>Shabnam Rezapour, Student, University of Oklahoma, United States</td>
</tr>
</tbody>
</table>

The problem of optimally deploying rescue and field medical teams to disaster sites in post-disaster circumstances of urban areas is formulated as a mixed integer model minimizing the expected number of fatalities. We analyze the effects of casualties streaming/pooling on field treatment process using an earthquake case problem in Tehran.

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Session Details</th>
<th>Track: Marketing and Operations Management Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-0416</td>
<td>Inference of Pricing-Inventory Interaction Effect on Product Returns</td>
<td>Annibal Sodero, Elliot Rabinovich</td>
</tr>
</tbody>
</table>
This paper evaluates changes in product returns related to retailers sharing information with customers about price-leadership and on-hand inventory at the time of sale. Using empirical data with a simulation model of sales-returns process, results show that the effect of price-leadership on product returns reverses for a threshold inventory position.

065-0472 Omni-Channel Driven Last-Mile Supply Network Strategies: A Configuration-Based Typology
Stanley Frederick W.T. Lim, Student, University of Cambridge, United Kingdom
Elliot Rabinoivich, Professor, Arizona State University Tempe, United States

We develop a configuration-based typology describing omni-channel driven last-mile supply network strategies by adopting the configuration theory approach. The typology comprises four ideal types described along the dimensions of network structure, network flow, relationship and governance, and service architecture: Efficient, Risk-hedging, Responsive, and Networked last-mile supply network strategy.

065-1150 The Impact of Scarcity Perceptions on Consumer Behavior
Annibal Sodero, Assistant Professor, University of Arkansas, United States
Elliot Rabinoivich, Professor, Arizona State University Tempe, United States
Tohir Aydiniyim, Assistant Professor, Baruch College, United States
Michael Pangburn, Associate Professor, University of Oregon, United States

We use archival data and econometrics to investigate the impact of inventory disclosure on sales at Amazon.com. We find that sales speed up as disclosed inventory levels go down, even after controlling for pricing and further endogeneity, suggesting that scarcity effects are present in this context.

Sunday, 08:00 AM - 09:30 AM
Session: Surveys and Case Studies in OM/Marketing Interface
Chair(s): Daniel Bumbulauskas

065-0265 Is Demand Chain Management the New Supply Chain Management? Will the Demand Channel Trump the Supply Channel?
Daniel Bumbulauskas, Assistant Professor, University of Northern Iowa, United States
Paul Bumbulauskas, President, PFC Services, Inc., United States
Kishor Sapkota, Student, University of Northern Iowa, United States

We provide a contemporary view of demand chain management (DCM) and an in-depth literature review that has tracked all of the literature to date and detailed case studies. While the concept of DCM is believed to have been introduced in the 1990’s, there has not been much research on DCM.

065-1491 Increasing Market Share by Improving SLA (Service Level Agreement): A Case Report in Lubricants Distribution
Valmir Moura, Student, Centro Estudal de Educação Tecnológia Paula Souza (CEETEIPS), Brazil
Marcelo Paranzini, Student, Centro Estudal de Educação Técnologica Paula Souza (CEETEIPS), Brazil
Elaine Simoes, Professor, CEETEESP - Centro Paula Souza, Brazil
Sergio Dos Santos Neto, Graduate, CEETEIPS - Centro Estudal de Educação Técnológico Paula Souza, Brazil
Caio Lago, Student, Centro Estudal de Educação Tecnológica Paula Souza (CEETEIPS), Brazil
Hellen Chagas, Student, CEETEIPS, Brazil

We report on the significant increase in market share obtained after improving the Service Level Agreement (SLA) by remodeling the distribution network in the national distribution of lubricants. The process consists of defining, measuring, and monitoring lead-time, targeting continuous improvement of service delivery.

065-1545 Examining Marketing and Operations Management as a Competitive Advantage in the National Football League
Mark Heilman, Assistant Professor, Rollins College, United States
Adrian Mayer, Lecturer, Rollins College, United States
Timothy Pett, Associate Professor, Rollins College, United States

Research on competitive advantage suggests when firms are able to recognize and exploit their marketing and value-chain, they outperform others. We evaluate the NFL using a process value-chain and marketing strategy approach between the league and franchise owners. Our analytic assessment indicates significant findings supporting a number of research hypotheses.

065-1981 How Can Operations Managers Meet the Need for Speed Demanded by The Modern Market Place?
Arthur Rutledge, Professor, Mercer Univ Atlanta, United States
Carol Cagle, Assistant Professor, Mercer Univ Atlanta, United States
Faye Sisk, Professor, Mercer Univ Atlanta, United States

The paper is an exploration of potential strategies for accelerating operations to achieve mass customization required by customers. There is a need to explore/develop alternative strategies because some of the commonly accepted best operations practices - Lean, JIT, and TOC, appear to be confounded by the need for speed.
### Session: Collaboration and capacity building in humanitarian operations

#### Chair(s): Mohammad Moshtari

#### 065-0181 Disaster Relief Inventory Management: Horizontal Cooperation between Humanitarian Organizations

Fuminori Toysaki, Associate Professor, York University, Canada  
Emel Arıkan, Assistant Professor, Vienna Univ of Econ & Business Admin, Austria  
Ioanna Falagari Sigala, Student, Vienna Univ of Econ & Business Admin, Austria  
Lena Silbermayr, Assistant Professor, Vienna Univ of Econ & Business Admin, Austria

This research focuses on horizontal cooperation in inventory management. Using a newsvendor-type model in the context of non-cooperative game theory, this research explores humanitarian organizations' incentive of joining the network, a coordination mechanism that achieves system optimality, and impacts of members' decisions about stock rationing.

#### 065-0452 The Role of Information Processing Capability for Managing Humanitarian Response

Raktim Pal, Associate Professor, James Madison University, United States  
Nezih Altay, Associate Professor, Depaul University, United States

Information is key to any humanitarian response, but often it is not available to be used readily. Thus, information processing, involving collection of data and transforming it into useful explicit information, is needed. We develop a conceptual framework for exploring how information processing capability affects effectiveness of humanitarian response.

#### 065-0447 An Organization Theoretic Understanding of Excellence in Humanitarian Operations

Santosh Mahapatra, Associate Professor, Clarkson University, United States  
Bhavaneer Rao, Senior Lecturer, Amrita University, India  
Maneesha Ramesh, Associate Professor, Amrita University, India  
Marcia McLain, Lecturer, Amrita University, India

Managing humanitarian supply chains is incredibly challenging. In light of humanitarian operations across multiple disasters such as tsunami, earthquakes, landslides, and floods by an exemplar NGO, this study examines the key organizational and process capabilities for superior humanitarian operations across the different stages of complex disaster management cycles.

#### 065-0196 Collaborative Relationship within a Humanitarian Setting: Stakeholder Pressure and Relational Orientation

Mohammad Moshtari, Lecturer, Hanken School of Economics, Finland

This study uses managers’ perceptions of 145 international humanitarian NGOs and 124 local humanitarian NGOs to explore the benefits of engagement in collaborative relationships from operational and strategic aspects. In addition, it investigates the relative efficacy of two antecedent factors, stakeholder pressure and relational orientation, influencing collaboration effort status.

### Session: Empirical Research in Supply Chain Management

#### Chair(s): Yan Dong

#### 065-0601 Promises, Challenges and Potential Perils of Big Data Predictive Analytics in Supply Chain Management

Ujjal Mukherjee, Assistant Professor, University of Illinois Urbana-Champaign, United States  
Kingshuk Sinha, Professor, University of Minnesota, United States

We conduct an exploratory study of application of ‘big data’ and predictive analytics in the context of supply chain management. We identify conditions when ‘big data’ predictive analytics based decision making is more effective than traditional tools. We also identify some limitations of using ‘big data.’

#### 065-0937 Evaluating Working Conditions in Supplier Factories in Developing Economies: An Empirical Analysis

Xiaojin Liu, University of Minnesota, United States  
Anant Mishra, George Mason University, United States  
Susan Goldstein, University of Minnesota, United States  
Kingshuk Sinha, University of Minnesota, United States

How can buyers in the same industry sector collaborate to design work and improve working conditions in supplier factories situated in developing economies? We examine this question by carrying out econometric analysis of archival data from safety inspection reports on supplier factories in Bangladesh.

#### 065-1098 The Role of Supply Chain Risks on Supplier-Customer Relationships and Performance

Keqiong Xu, Associate Professor, University of Texas San Antonio, United States  
Yan Dong, Assistant Professor, University of South Carolina, United States  
Jayanth Jayaram, Professor, University of South Carolina, United States

We study how supply chain risks affect supply chain performance using public data. We identify risk factors associated with supply chain decisions and empirically examine how to improve supply chain performance given these factors.

#### 065-1156 When Corporate Social Responsibility (CSR) Backfires: A Study of CSR Programs and Product Recalls

Sining Song, Student, Arizona State University Tempe, United States  
Thomas Kull, Associate Professor, Arizona State University Tempe, United States

Drawing from the signaling theory and expectation-violation theory, we explore the multi-dimensional effects of a firm’s CSR programs on firm performance in product recalls. Our findings advance the understandings of the association between CSR and product recalls, and the role of a firm’s supply chain structure in product recalls.
Promoting Patient Safety in Emergency Room: The High Reliability Theory
Sina Zare, Student, University of Texas Arlington, United States
Maryam Mahdikhani, Student, Univ of New Brunswick, United States

Are Brazilian Hospitals Focused on Quality and Safety?
Kim Uehara, Student, Eaesp - Fgv, Brazil
Rebeca Graf, Student, Eaesp - Fgv, Brazil
Maria Laiz Zanardo, Lecturer, Eaesp - Fgv, Brazil
Laura Schiesari, Lecturer, Eaesp - Fgv, Brazil
Ana Maria Malik, Professor, Eaesp - Fgv, Brazil

Double-Sided Network Externalities in Healthcare Information Exchanges
Emre Demirezen, Assistant Professor, Binghamton University, United States
Subodha Kumar, Professor, Texas A&M University College Station, United States
Arun Sen, Professor, Texas A&M University College Station, United States

Variation in Medical Charges and Quality of Patient Care: An Empirical Analysis for Payment Reform Models
Seokjun Youn, Student, Texas A&M University College Station, United States
Gregory Heim, Associate Professor, Texas A&M University College Station, United States
Subodha Kumar, Professor, Texas A&M University College Station, United States
Chelliah Sriskandarajah, Professor, Texas A&M University College Station, United States

Task Switching and Productivity in Collaborative Work: A Field Study of Hospitalists
Lu Wang, Student, Northwestern University Kellogg School o, United States
Itai Gurvich, Associate Professor, Kellogg School of Management, United States
Jan van Mieghem, Professor, Kellogg School of Management, United States
Kevin O'Leary, Associate Professor, Feinberg School of Medicine, United States

Are Brazilian Hospitals Focused on Quality and Safety?
Ana Maria Malik, Professor, Eaesp - Fgv, Brazil
Laura Schiesari, Lecturer, Eaesp - Fgv, Brazil
Maria Laiz Zanardo, Lecturer, Eaesp - Fgv, Brazil
Rebeca Graf, Student, Eaesp - Fgv, Brazil
Kim Uehara, Student, Eaesp - Fgv, Brazil

Fifteen years after the official beginning of hospital accreditation in Brazil, less than 5% of 6,000 hospitals are accredited. We survey 700 hospitals in São Paulo state and find that they do not comply with many national safety regulations. We explore managerial impedances to addressing quality and safety issues.

Promoting Patient Safety in Emergency Room: The High Reliability Theory
Maryam Mahdikhani, Student, Univ of New Brunswick, United States
Sina Zare, Student, University of Texas Arlington, United States

Do Mandatory Overtime Laws Improve Quality? Staffing Decisions and Operational Flexibility of Nursing Homes
Feng (Susan) Lu, Associate Professor, University of North Carolina Chapel Hill, United States
Lauren Lu, Associate Professor, Pennsylvania State University College of Medicine, United States
We investigate the effect of High Reliability Organization concepts on the performance of involved agents at emergency rooms to increase the efficiency of performance. Applying agent based modeling we illustrate the effects of agents' attributes on performance.

**065-1582** Focus, Patient-Centeredness, and Performance: An Empirical Examination in U.S. Hospitals  
Sehwon Kang, Student, University of Minnesota, United States  
Rachna Shah, Associate Professor, University of Minnesota, United States

Although hospitals strive to achieve high clinical outcomes and patient satisfaction, many struggle to achieve both concurrently. Using rigorous empirical analysis with secondary data from 3,007 U.S. hospitals over six years, we show that balancing focus and patient-centeredness enables high clinical and patient performance.

**065-1129** Examining Social Learning and Mortality Outcomes Among Cardiothoracic Surgeons  
Xin Ding, Associate Professor, University of Houston, United States  
David Dobrzykowski, Assistant Professor, Rutgers University, United States

We examine two relevant aspects of social learning theory to reveal different learning patterns among surgeons performing Coronary Artery Bypass Grafting (CABG) procedures. Our findings show that outcomes experience lowers mortality rates, but only for high volume surgeons, while vicarious experience improves outcomes for low volume surgeons.

**065-1571** A New Business Model for Hospital Operations  
David Golmohammadi, Associate Professor, University of Massachusetts Boston, United States

Reforming the U.S. healthcare system will require a fundamentally different approach to structuring hospital operations. We propose three operations models that emphasize categorizing patients based on the type of treatment they require: Focused Service Operations Hospitals, Custom Care Hospitals, and two types of Emergency Departments.

**065-1952** The Implementation of a Quality Office in Small Hospital  
Rebeca Graf, Student, Fundacao Getulio Vargas, Brazil  
Ana Maria Malik, Professor, Eaesw - Fgv, Brazil

This study, conducted in a small hospital in Brazil, identified main barriers and drivers for the unsuccessful implementation of a Quality Unit. Main findings of the study include an absence of culture for quality and failures in communication as barriers, and training and support of upper management as drivers.

**065-1708** The Impact of Codified Knowledge Sharing On Risk Management Performance  
Mecit Can Emre Simsekler, Lecturer, University College London, United Kingdom  
Bilal Gokpinar, Assistant Professor, University College London, United Kingdom

Focusing on codified knowledge sharing among healthcare personnel in the form of written documents, we examine the role of the nature and content of codified knowledge on risk management performance. We use a unique dataset from NHS acute trusts in England and employ text-mining techniques to investigate our hypotheses.

**065-0050** Big Data vs. Observational Data: Quantifying the Impact of Input Complexity on Hospitalist Productivity.  
Lu Wang, Student, Northwestern University Kellogg School o, United States  
Itai Gurvich, Associate Professor, Northwestern University, United States  
Jan van Mieghem, Professor, Northwestern University, United States  
Nicholas Soulakis, Assistant Professor, Northwestern University, United States

We quantify input complexity using the patient care team size and composition. We show that the synchronous information from new team members and asynchronous information existing team members take hospitalists more time to process. We specifically identify influential team member types and activity types that contribute to information complexity.

**065-0948** The Impact of Operational Failures and Workarounds on Patient Falls

---

**Sunday, 09:45 AM - 11:15 AM**

**Chair(s):** Lawrence Fredendall

**Session: Re-envisioning Healthcare Delivery in Hospitals**

**Track: Healthcare Operations Management**

**065-0600** Examining Social Learning and Mortality Outcomes Among Cardiothoracic Surgeons  
Xin Ding, Associate Professor, University of Houston, United States  
David Dobrzykowski, Assistant Professor, Rutgers University, United States

We examine two relevant aspects of social learning theory to reveal different learning patterns among surgeons performing Coronary Artery Bypass Grafting (CABG) procedures. Our findings show that outcomes experience lowers mortality rates, but only for high volume surgeons, while vicarious experience improves outcomes for low volume surgeons.

**065-1169** An Economic Analysis of Hospital-Acquired Central-Line Infections: The Role of Hospital Architecture  
Liam O'Neill, Associate Professor, University of North Texas, United States  
Simon Park, Student, University of North Texas, United States

We tested how private rooms affect the risk of a central-line infection for 1.4 million patients at 345 Texas hospitals. Hospitals with mostly semi-private rooms had 19.6 percent more central line infections than those with mostly private rooms. We find that private hospital rooms save millions of dollars and hundreds of lives.

**065-1571** An Examination of the Operating Room's Physical Environmental Impact on Multi-Operational Flows  
Lawrence Fredendall, , Clemson University, United States  
Yann Ferrand, Assistant Professor, Clemson University, United States  
Kevin Taaffe, Associate Professor, Clemson University, United States  
Dee San, Associate Professor, Medical University of South Carolina, United States  
Anjali Joseph, Professor, Clemson University, United States  
Scott Reeves, Professor, Medical University of South Carolina, United States

Surgical procedures performed within the defined physical space of operating room (OR) suites require effective multi-operational flow orchestration of patients, equipment, materials, staff, and information for safe and efficient outcomes. We examine audio/video observational, focus groups, and simulation techniques to design the optimal OR facility of the future.
Using survey and clinical data from 294 medical/surgical units in 64 hospitals, we examine the impact of operational failures and workarounds on patient falls, pressure ulcers, and infections. We find that operational failures are associated with a higher frequency of patient falls, after controlling for patient severity.

**369** Sunday, 09:45 AM - 11:15 AM, **Chair(s):** Ruomeng Cui

**Session:** Empirical research: social media and retail operations

**Track:** Retail Operations Management

**065-0015** The Operational Value of Social Media Information

- Dennis Zhang, Student, Northwestern University, United States
- Ruomeng Cui, Assistant Professor, Indiana University Bloomington, United States
- Santiago Gallino, Assistant Professor, Dartmouth College, United States
- Antonio Moreno-Garcia, Assistant Professor, Northwestern University, United States

We empirically explore how social media information helps sales forecasting. Using daily sales data from an online apparel company and publicly available Facebook posts (users' comments and likes data), we apply various machine learning methods and find a statistically significant improvement in sales forecasts.

**065-0254** The Value of Social Media Data in Color Trends Forecasting

- Youran Fu, Student, The Wharton School, United States
- Marshall Fisher, Professor, University of Pennsylvania, United States

We partnered with a leading apparel retailer to investigate how social media data can be used to improve fashion color trend forecasting. By incorporating fine-grained Twitter data and a Google search volume index we find product color forecast error decreased by 20% over conventional methods.

**065-1151** Assessing the Effects of Social Interactions on Sales in Social Shopping

- Annibal Sodero, Assistant Professor, University of Arkansas, United States
- Elliot Rabinovich, Professor, Arizona State University Tempe, United States
- Bin Gu, Associate Professor, Arizona State University Tempe, United States

We conduct an experiment to empirically assess the assumption that social interactions among consumers in online communities will foster the sales of social shopping deals. We find that will be the case when the early buyers of those types of deals are boundary spanners even after controlling for marketing activity.

**370** Sunday, 09:45 AM - 11:15 AM, **Chair(s):** Rodrigo Garza-Burgos

**Session:** Analysis of Business Enterprises

**Track:** Empirical Research in Operations Management

**065-0692** Characterization of the operations management of micro and small enterprises of Teresina, Piauí, Brazil

- Antônio Araújo, Assistant Professor, Faculdade Santo Agostinho, Brazil
- Igo Silva, Student, Faculdade Santo Agostinho, Brazil
- Júlio Pereira Filho, Student, Faculdade Santo Agostinho, Brazil
- Daniel Oliveira, Student, Faculdade Santo Agostinho, Brazil
- Joenne Silva, Student, Faculdade Santo Agostinho, Brazil

This research aimed to characterize the operations management of micro and small businesses in the city of Teresina, capital of Piauí state, Brazil. The results point to the managerial activity development time associated with the dimensions of factors: business, employees and managers.

**065-1492** A Chinese View of Business Process Management Practices and Firms’ Performance

- Bahar Movahedi, Assistant Professor, North Carolina Central University, United States
- Kayvan Lavassani, Assistant Professor, North Carolina Central University, United States
- Xiaoli Qi, Assistant Professor, Hebei University of Technology, China

Process management practices have been widely studied in the context of developing economies. We present an insight into the Chinese view of business process orientation practices based on an empirical study of executive managers in China. Furthermore, we analyzed the benefits of business process orientation using factor analysis techniques.

**065-0759** The Influence of Information Security on SME Competitiveness in Brazil

- Emerson Beneton, Professor, UNIP, Brazil
- Getulio Akabane, Retired, CEETEPS, Brazil
- Washington Luiz Soares, Student, UNISANTOS, Brazil

In the present scenario, enterprise competitiveness is defined by innovation and management decision making speed that can define its marketplace position. We assume companies' perceptions regarding how information integrity can affect their competitiveness. The structured questionnaire was applied as research methodology, and a statistical analysis is conducted.

**065-1673** Managerial and Learning Processes Impact on Mexican SMEs

- Jesus Orozco, Assistant Professor, Ipaide Business School, Mexico
- Rodrigo Garza-Burgos, Assistant Professor, Ipaide Business School, Mexico

In this research we evaluate the design and structure of managerial and learning processes in Mexican small and medium companies. Using an extended survey, we try to prove that when such processes are well suited and aligned, they can have a positive impact on the companies’ performance.

**065-0999** How Projects Can Contribute to the Performance of Brazil’s Public Sector: A Case Study

- Paulo Maceta, Student, Universidade De Sao Paulo, Brazil
- Fernando Berssaneti, Professor, Universidade De Sao Paulo, Brazil
The New Public Management introduces operations management’s concepts from private sector into public sector. One of these concepts is performance that links system’s inputs and outputs. Our case study analyses the linkage of the Finance Department of São Paulo’s project scopes with the three Es of performance (efficiency, effectiveness, and economy).

**Sunday, 09:45 AM - 11:15 AM**

**371 - Sunday, 09:45 AM - 11:15 AM, Edelweiss**  
**Track:** Scheduling and Logistics  
**Chair(s):** James Ang  
Kok Choon Tan

**065-0226 - An Integrated System for Synchronized Urban Logistics**

James Ang, Associate Professor, National University of Singapore, Singapore  
Kok Choon Tan, Associate Professor, National University of Singapore, Singapore  
Robert De Souza, Professor, National University of Singapore, Singapore  
Gajanan Panchal, Research Fellow, National University of Singapore, Singapore  
Narath Bhusiri, Research Fellow, National University of Singapore, Singapore  
Hassan Mirzahosseiniian, Research Fellow, National University of Singapore, Singapore

We propose a conceptual integrated system that brings all stakeholders of urban logistics on a single platform, where information, material and cash flows are synchronized to attain sustainable logistics operations. Case of precinct retail logistics is used to validate this concept.

**065-0238 - Urban Distribution in Singapore**

Loo Hay Lee, Professor, National University of Singapore, Singapore  
Ek Peng Chew, Associate Professor, National University of Singapore, Singapore

The Center for Next Generation Logistics (C4NGL) is a collaboration between Georgia Tech and the National University of Singapore primarily tasked with researching urban distribution. In this talk, we will share the findings from several C4NGL urban logistics projects completed with Singaporean companies.

**065-0881 - E-Commerce - a Game-Changer of Transport Systems?**

Efrem Lengauer, Professor, University of Applied Sciences Upper Austria, Austria  
Markus Gerschberger, University of Applied Sciences Upper Austria, Austria  
Franz Staberhofer, University of Applied Sciences Upper Austria, Austria

We investigate the effects of a growing trend towards e-commerce on national transport systems. Our investigation showed that if the last-mile delivery executed by logistics-service-providers is done properly e-commerce has a positive (decreasing cost) effect on the overall transport system.

**065-0630 - Joint Capacity and Inventory Logistics of Mobile Modular Production Systems**

Satya Malladi, Student, Georgia Institute of Technology, United States  
Chelsea White III, Professor, Georgia Institute of Technology, United States  
Alan Erera, Professor, Georgia Institute of Technology, United States

Modular/mobile production systems facilitate responsiveness to spatial and temporal fluctuations in demand. How should logistics adjustments of such systems be planned taking into account uncertainty and partial observability of demand? We explore several approaches for evaluating the value added by modular/mobile production.

**372 - Sunday, 09:45 AM - 11:15 AM, Fuschia**  
**Track:** Empirical Research in Operations Management  
**Chair(s):** Qile He

**065-1813 - Empirical Study of Supplier Hoarding for Post-Disaster Supply Chain Recovery**

Hsin-tsou Ku, Student, National Taiwan University, Taiwan, Republic of China  
Jiu-Bing Sheu, ., Taiwan

We address the issue of post-disaster crop supply chain recovery under the influences of supplier behavioral uncertainty attributed to hoarding intention. We adopt a conceptual model which characterizes the antecedents of supplier hoarding intention that may be revealed in crop supply chain is proposed and validated using survey data.

**065-0025 - Supplier Involvement in New Product Development: A Study in the Brazilian Footwear Industry**

Diego Fettermann, Assistant Professor, Federal University of Santa Catarina, Brazil  
Guilherme Tortorella, Assistant Professor, Federal University of Santa Catarina, Brazil  
Marcia Echeveste, Assistant Professor, Federal University of Rio Grande do Sul, Brazil  
Carlos Ernani Fries, Associate Professor, Federal University of Santa Catarina, Brazil

This study evaluates benefits and success factors of supplier involvement during the NPD process at three footwear companies in Brazil. The method developed indicates which items must be implemented as common objectives between a company and its supplier, as well as identifies the most influential points for the success of the partnership.

**065-1035 - Supply Chain Transformation through Lean - Some Challenges**

Saideep Rathnam, Student, Indian Institute of Management Bangalore, India  
Krishna Sundar Diathia, Professor, Indian Institute of Management Bangalore, India

The key challenges in bringing about and sustaining lean transformation across the supply chain include establishing empirical linkages between elements of understanding of counter- traditional concepts; transformational leadership styles of top and mid-level leaderships; the role played by tier structure in lean transformation in SMEs; and Organizational culture as intervening variables.

**065-1357 - Power and Trust in Supply Chain Partnerships: Interactions and Impact on Partnership Quality and Performance**

Qile He, Associate Professor, Coventry University, United Kingdom  
Abby Ghobadian, Professor, University of Reading, United Kingdom  
David Gallear, Professor, Brunel University, United Kingdom
Based on SEM analysis of 413 survey responses from the supply network of a large steel producer, we examine the influence of inter-firm trust and indicators of relative power between supply chain partners, and their interactions, on partnership quality and the subsequent supply chain performance of supply chain partners.

**065-1971**  
The Manufacturer's Strategic Responses to the Imbalance of Power in Supply Chain Relationships  
Zhixiong Tao, Student, McGill University, Canada  
Shanli Li, Professor, McGill University, Canada  
Saibal Ray, Professor, McGill University, Canada  

Our research presents a model of the manufacturer's strategic responses to the imbalance of power in supply chain relationships and empirically tests it using plant-level data. Analysis results show that in different contexts, the manufacturer will adopt different strategies and integration mechanisms to counteract the dominance of the strong actors.

**373**  
Sunday, 09:45 AM - 11:15 AM, Gardenia  
**Session:** Environmental Considerations in Operations  
**Chair(s):** Ammar Alqahtani

**065-0703**  
A Hybrid Data Envelopment Analysis Approach for Performance Evaluation: A Food Industry Case Study  
Gazi Durman, Student, University of Bridgeport, United States  
Ozden Tozanli, Student, University of Bridgeport, United States  
Elif Kongo, Associate Professor, University of Bridgeport, United States

Sustainability is often reliant on the efficiency of a business's internal and external operations in addition to overall customer satisfaction. We propose a hybrid approach combining fuzzy AHP and DEA methodologies for retail performance evaluation. A food industry case study is also provided.

**065-0826**  
Evaluation of Different Designs of End-Of-Life Products Using Linear Physical Programming  
Aditi Joshi, Student, Northeastern University, United States  
Surendra Gupta, Professor, Northeastern University, United States

We present a linear physical programming approach for sensor embedded End-Of-Life (EOL) products with design alternatives. The main objective of this study is to determine the strategy for satisfying the components demands for minimizing the total cost and disposal weight and maximizing the quality level and material sales revenue.

**065-1488**  
Application of Multi Criteria Decision Making in Optimizing End-Of-Life Processes  
Aditya Pandit, Student, Northeastern University, United States  
Surendra Gupta, Professor, Northeastern University, United States

We present a Multi-Criteria Decision Making (MCDM) approach for optimizing End-of-life decisions (EOLD) in the automobile sector. We attempt to identify the chief constraints and how best to prioritize goals in order to decide if reuse, recycling, or disposal is the most appropriate EOLD.

**065-0825**  
Two-Dimensional Warranty for an End-Of-Life Derived Products  
Ammar Alqahtani, Student, King Abdulaziz University, Saudi Arabia  
Surendra Gupta, Professor, Northeastern University, United States

We present an approach to determine a two-dimensional warranty period for the components, materials, and products derived from End-of-Life products to meet components, materials and products demands while minimizing the cost associated with warranty and maximizing the manufacturer's profits.

**374**  
Sunday, 09:45 AM - 11:15 AM, Hibiscus  
**Session:** Examples of Collaboration between Academia and Industry in Pricing Applications  
**Chair:** Georgia Perakis

**065-1030**  
Scheduling Promotion Vehicles to Boost Profits  
Lennart Baardman, Student, Massachusetts Institute of Technology, United States  
Maxime Cohen, Research Scientist, Google, United States  
Georgia Perakis, , Massachusetts Institute of Technology, United States  
Danny Segev, Professor, University of Haifa, Israel

Retailers use promotion vehicles (e.g., flyers, commercials) to increase profits. We develop models to improve promotion vehicle scheduling. To solve this, we construct a greedy algorithm with provable guarantee and an IP of polynomial size yielding an epsilon-approximation. Finally, using supermarket data, we show that our models improve profits significantly.

**065-1044**  
Pricing for a Satellite Service Provider  
Georgia Perakis, Associate Professor, Massachusetts Institute of Technology, United States  
Charles Thraves, Student, Massachusetts Institute of Technology, United States

We present a satellite pricing optimization problem of several data plans of a real firm. First we estimate the missing data with a parametric density function. We then formulate the optimization problem as a MIP and develop heuristics to solve larger instances. Our results indicate the company can increase profits by 10%.

**065-1065**  
Dynamic Ship Routing With Limited Foresight  
Max Biggs, Student, Massachusetts Institute of Technology, United States  
Georgia Perakis, Associate Professor, Massachusetts Institute of Technology, United States

A broker has to choose from a selection of available cargoes in the current time period with uncertain future availability. Therefore, high valued cargo may be discharged in a less profitable region. We model this problem as a finite horizon stochastic dynamic program and propose several approximation algorithms.

**065-1158**  
Balancing Profit Maximization and Inventory for Recommending Personalized Bundles  
Pavithra Harsha, Research Staff Member, IBM, United States  
Anna Papath, Student, Massachusetts Institute of Technology, United States  
Georgia Perakis, Associate Professor, Massachusetts Institute of Technology, United States
Market forecasts show e-commerce is poised to inherit a significant proportion of retail spending. We present a model that guarantees customer satisfaction by providing relevant recommendations at personalized prices while balancing profit maximization with business operations. We validate our model using actual e-tailer data.

### Sunday, 09:45 AM - 11:15 AM

**Session: Topics in Socially Responsible Supply Chains**  
**Chair(s):** Soo-Haeng Cho Xin Fang

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
| 065-0320     | Supplier Selection and Product Allocation under the Risk of Product Recall | Long He, Assistant Professor, National University of Singapore, Singapore  
Ying Rong, Associate Professor, Shanghai Jiao Tong University, China  
Max Shen, Professor, University of California Berkeley, United States |
| 065-0467     | Cooperative Approaches to Managing Suppliers: Joint Auditing and Information Sharing | Xin Fang, Assistant Professor, Singapore Management University, Singapore  
Soo-Haeng Cho, Associate Professor, Carnegie Mellon University, United States |
| 065-0526     | Distribution Strategies for Supporting Poor Retailers in Developing Countries | Luyi Gui, Assistant Professor, University of California Irvine, United States  
Shuya Yin, Associate Professor, University of California Irvine, United States  
Christopher Tang, Professor, University of California Los Angeles, United States |
| 065-0819     | Auditing Supplier for Social and Environmental Compliance | Hossein Rikhtehgar Berenji, Student, University of Oregon, United States  
Nagesh Murthy, Associate Professor, University of Oregon, United States  
Zhibin (Ben) Yang, Associate Professor, University of Oregon, United States |

We model a supply chain wherein the buyer audits the supplier who makes effort to comply with the buyer’s environmental and social code of conduct. We explore the relationship between auditing and compliance efforts. We find that the buyer’s auditing effort is discontinuous and non-monotonic in the supplier’s compliance effort.

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
| 065-0913     | Impact of Fraudulent Transactions on Customer Behavior in Financial Industry | Sriram Somanchi, Academic Position, University of Notre Dame, United States  
Rahul Telang, Carnegie Mellon University, United States |
| 065-1513     | Towards Optimal Multichannel Attribution: Understanding Conversion Paths of Heterogeneous Consumers | Ran Zhang, Student, University of California Irvine, United States  
Shivendu Shivendu, Assistant Professor, University of South Florida, United States  
Daniel Zantedeschi, Assistant Professor, University of South Florida, United States |

In this work we present an empirical framework to disentangle and causally identify the heterogeneous impact of display ads on consumers’ path-to-purchase by comparing different consumers’ histories; i.e. first time vs. returning consumers. We then discuss the implications for optimal multi-channel attribution modeling in online digital platforms.

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
| 065-1124     | Personalized Learning with Computer Generated Adaptive Homework: A Randomized Field Experiment | Anuj Kumar, Assistant Professor, University of Florida, United States  
Amit Mehra, Associate Professor, University of Texas Dallas, United States |
| 065-1983     | The Impact of Competing Tasks in Crowdsourcing Contests | Jiahui Mo, Assistant Professor, Nanyang Technological University, Singapore  
Syam Menon, Associate Professor, University of Texas Dallas, United States  
Sumit Sarkar, University of Texas Dallas, United States |

A crowdsourcing contest platform provides a two-sided marketplace that connects members who have tasks to be solved with members who have the skills to solve them. Tasks in a category compete for the same pool of solvers. We investigate how competing tasks influence task participants, quality and success.
<table>
<thead>
<tr>
<th>Session ID</th>
<th>Session Time</th>
<th>Session Name</th>
<th>Track</th>
<th>Chair(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-1715</td>
<td>Sunday, 09:45 AM - 11:15 AM, Magnolia</td>
<td>The Impact of an Integrative Mobile Social Media Platform on Hospital Patient Flow and Operations Management</td>
<td>Manufacturing Operations</td>
<td>Richard Franz</td>
</tr>
<tr>
<td>065-0031</td>
<td>Sunday, 09:45 AM - 11:15 AM, Magnolia</td>
<td>Systematic Layout Planning Aided By Multi-Criteria Approach in a Brazilian Restaurant</td>
<td>Information in Operations Management</td>
<td>Richard Franz</td>
</tr>
<tr>
<td>065-0624</td>
<td>Sunday, 09:45 AM - 11:15 AM, Magnolia</td>
<td>A Production Seat System for Sales and Production Departments in Engineer-To-Order Firms</td>
<td>Information in Operations Management</td>
<td>Richard Franz</td>
</tr>
<tr>
<td>065-0037</td>
<td>Sunday, 09:45 AM - 11:15 AM, Magnolia</td>
<td>Sustaining Process Improvement: The Red Queen Effect</td>
<td>Information in Operations Management</td>
<td>Richard Franz</td>
</tr>
<tr>
<td>065-0486</td>
<td>Sunday, 09:45 AM - 11:15 AM, Orange Blossom</td>
<td>Impact of Customer Feedback in Continuous Product Development: Evidence from the App Store</td>
<td>Innovation, Learning and Technology Management</td>
<td>Onesun Yoo</td>
</tr>
<tr>
<td>065-0769</td>
<td>Sunday, 09:45 AM - 11:15 AM, Orange Blossom</td>
<td>Selling New Products through Consumer Learning</td>
<td>Innovation, Learning and Technology Management</td>
<td>Onesun Yoo</td>
</tr>
</tbody>
</table>
In new product sales, consumers are uncertain about the products’ valuations; therefore they may strategically delay their purchase for more information from the seller, third-parties, or peers to reduce their valuation uncertainty. We study how the selling firm should influence consumer learning in new product sales.

We consider service systems where customers estimate service quality using anecdotes. We characterize the server’s pricing, quality information disclosure, and quality control decisions under revenue and welfare maximization. Bounded rationality changes the server’s pricing decision greatly, and more quality information may lead to lower price and lower consumer surplus.

We provide a theoretical foundation for the lean startup paradigm, which helps us better understand why lean start-up paradigm works, and predict when that paradigm may not hold. We discuss the implications of our results to practice and theory of entrepreneurship.

The supply chain of a product historically may converge to one main type of governance, but eventually forces inside or outside the supply chain can be strong enough to forge a new type of governance. It was found in this research that in the London coffee business two very different supply chain governance types are able to coexist in order to supply the market. One can be characterized as a market type of governance and the other one is a relational type of governance.

As the Vice President of Sales & Operations Planning in one of the most complex supply chains of the world, I developed analytical tools for organizational decision-making. I will share the lessons learned from a major transformation program which brought the epic business process up-to-date.

We explore the governance structure(s) of the solar energy value chain in Egypt and the associated governance relationships and suitable upgrading types to be followed. Global value chain (GVC) theory is used to identify the operating mechanisms of the value chain and classify the relationships guiding the different structures.

We compare the effectiveness of the overlapping and the non-overlapping temporal aggregation on forecasting performance. Theoretical Mean Squared Error expressions are derived in order to contrast the relevant forecasting accuracies. The theoretical analysis is supported by an extensive numerical investigation and experimentation with an empirical dataset.

A Guaranteed Support Price (GSP) for a crop is a guaranteed per-unit price, announced before the growing season, at which a governmental entity promises to procure the crop from farmers. We derive analytically-supported insights on the welfare implications of a GSP program and examine related questions.

We explore the effect of limited capacity on a supplier's channel strategy and a buyer's competitive behavior. We characterize equilibrium channel strategy, ordering, and selling decisions. We find that moderate capacity benefits the supplier, buyer, and consumer simultaneously and that the buyer may order excessively to preempt downstream competition.

Dynamic Rebate Strategies for Limited Inventories
Shanshan Hu, Assistant Professor, Indiana University Bloomington, United States
Sunday, 09:45 AM - 11:15 AM

**Xing Hu,** Assistant Professor, University of Oregon, United States

**Qing Ye,** Associate Professor, Tsinghua University, China

We model a retailer who maximizes the expected revenue of limited inventory over a finite horizon by dynamically adjusting product price and rebates. We characterize the optimal discount-rebate strategy as a function of inventory and time-to-go. In seeking practical heuristics, we analyze the deterministic approximation of the stochastic model.

---

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-0341</td>
<td>Designing Servitized Business Models through Cross-Industry Innovation</td>
<td>Michael Naor, Assistant Professor, Georgetown University, United States&lt;br&gt;Ednilson Bernardes, Associate Professor, West Virginia University, United States&lt;br&gt;Cheyrl Dreuleh, Associate Professor, George Mason University, United States</td>
</tr>
<tr>
<td>065-0946</td>
<td>Building a Taxonomy for Innovation in Service</td>
<td>José Jacinthe, Doutor, INSTITUTO FEDERAL DE SÃO PAULO (IFSP) - UNIVERSIDADE PAULISTA (UNIP), Brazil&lt;br&gt;Marcia Terra da Silva, Doctor, Universidade Paulista - Unip, Brazil&lt;br&gt;Rodrigo Gonçalves, UNIVERSIDADE PAULISTA - UNIP, Brazil</td>
</tr>
<tr>
<td>065-1220</td>
<td>Port Services Innovation: Ningbo Port Users’ Expectation</td>
<td>Nachiappan Subramanian, Associate Professor, Nottingham University, Ningbo China, China&lt;br&gt;Muhammad Abdulrahman, Assistant Professor, Nottingham University Business School China, China&lt;br&gt;Lin Wu, Student, Nottingham University Business School China, China&lt;br&gt;Zun Wang, Student, Information Technology and Services, United States</td>
</tr>
<tr>
<td>065-1785</td>
<td>Near Misses Reporting by Suppliers: An Assessment of the Motivational Factors</td>
<td>Olena Rudna, Student, Rutgers University, United States</td>
</tr>
<tr>
<td>065-1239</td>
<td>Dual Sourcing Under Capacity Investments</td>
<td>Tarun Jain, Student, Indian Institute of Management Bangalore, India&lt;br&gt;Jishnu Hazra, Professor, Indian Institute of Management Bangalore, India</td>
</tr>
<tr>
<td>065-0069</td>
<td>Contagion Risk in Supply Chain: An Event Study Perspective</td>
<td>Alireza Azimian, Student, Wilfrid Laurier University, Canada&lt;br&gt;Kevin Hendricks, Professor, Wilfrid Laurier University, Canada</td>
</tr>
<tr>
<td>065-0377</td>
<td>How Do Delay Announcements Shape Customer Behavior? An Empirical Study</td>
<td>Qiuping Yu, Assistant Professor, Indiana University, United States&lt;br&gt;Gad Allon, Professor, Northwestern University, United States</td>
</tr>
</tbody>
</table>
**Operational Transparency and the Impact of Disruptions**

William Schmidt, Assistant Professor, Cornell University, United States

Athan Raman, Professor, Harvard University, United States

We examine whether operational transparency with investors mitigates the value destruction caused by operational disruptions. We exploit a natural quasi-experiment in our analysis - an exogenous regulatory shock. Our research suggests that credible transparency with investors can alleviate over 50% of the loss in market value from operational disruption announcements.

**Determinants of Distribution Channel Choice in Pharmaceutical Industry: Specialty Drugs**

Liang Xu, Student, Penn State University University Park, United States

Vidya Mani, Assistant Professor, Penn State University University Park, United States

Hui Zhao, Associate Professor, Penn State University University Park, United States

We use privately collected multi-year transaction data to study determinants of the choice of distribution channels for specialty and non-specialty drugs. We identify five categories of factors that drive the distribution channel choice, i.e., drug, POCs, market, company and competition related characteristics.

**Supply Chain Analysis of Contract Farming**

Awi Federgruen, Professor, Columbia University, United States

Upmanu Lall, Professor, Columbia University, United States

A. Serdar Simsek, Assistant Professor, University of Texas Dallas, United States

In a contract farming setting, a manufacturer who owns several production plants selects the set of farmers that minimizes her expected procurement and distribution costs before the growing season. We present two solution methods to this problem. We applied our model to a company contracting with thousands of farmers in India.

**Dynamic, Data-Driven Resource Allocation for Recyclables Collection in a Smart City**

Wang Chen, Researcher, SAP AG, Singapore

Lindawati., Researcher, SAP Research and Innovation Center, Singapore

In countries like Singapore, the infrastructure and resources are available for household recycling. However, the utilization rate of these services varies with times and locations. We propose a dynamic, data-driven allocation solution for better deployment of these resources, with the goal of improving utilization rates.

**An Urban Logistics Platform to Encourage Recycling in a Smart City**

Lindawati., Researcher, SAP Research and Innovation Center, Singapore

Wang Chen, Researcher, SAP AG, Singapore

The accessibility of recycling infrastructure is an issue that prevents people from recycling. We propose an urban logistics platform for recyclables collection using empty back-haul from truck deliveries. We study two main objectives: helping households submit collection requests and helping the recycling company to consolidate and schedule pickup.

**Cleaning Solvent Selection Using Economic, Environmental, and Safety Factors: A Multi-Criteria Model**

Thomas Sloan, Associate Professor, University of Massachusetts Lowell, United States

Joseph Sarkis, Professor, Worcester Polytechnic Institute, United States

We study the problem of cleaning solvent substitution using a multi-criteria optimization model. Data from the CleanerSolutions database at UMass Lowell's Toxics Use Reduction Institute (TURI) are used to study the trade-offs between financial, environmental, and safety performance of different cleaning solvents. The goal of our analysis is to promote greener, safer alternatives.

**Lean, Green, and Innovation: Synergies and Misalignment**

Maneesh Kumar, Senior Lecturer, Cardiff University, United Kingdom

Vasco Rodrigues, Lecturer, Cardiff University, United Kingdom

We investigate the triadic relationship between lean and green strategies and innovation to identify synergies, misalignment, barriers and drivers among these three topics. Findings from two logistics case studies indicate that green benefits and process/incremental innovation are realized by effective lean implementation. Lean and green practices also impact the innovation capabilities of companies.

**Cleaner Production Processes Applied to Low-Tech Electronic Enterprises**

Janaina Gameiro, Vice President EHS, Siemens Energy Inc, United States

Maria Lúcia Da Silva, Professor, Universidade De Sao Paulo, Brazil

Every year, the electronics sector shows a huge demand for technological improvements that require innovation and significant changes to production techniques. We evaluate the possibility of using simple strategies for minimization of water consumption and waste in the production of electronic components.
This session is by invitation only. This Program provides new university professionals in OM with career-building advice in developing excellence in their personal programs of teaching, research, and service. The program is highly interactive and features internationally recognized senior OM scholars as discussion leaders.

### 88
**Session:** Estimation and Optimization Issues for Perishable and Deteriorating Inventories  
**Track:** Inventory Management  
**Chair(s):** Saurabh Bansal

#### 065-0975
**Title:** Order Variability in Perishable Product Supply Chains  
**Authors:** Sandra Transchel, Associate Professor, Kuehne Logistics University, Germany  
Stefan Minner, Professor, Technische Universitat Munchen, Germany

We study the impact of product perishability on order variability/bullwhip effect in supply chains. We find fundamental differences from non-perishable product supply chains, mainly driven by the impact of inventory depletion, stock-out management, and service levels. We show how these factors affect decision and performance of upstream supply chain stages.

#### 065-0300
**Title:** An Integrated Multi-Lot-Size Production-Inventory Model for Deteriorating Items Under Time Value of Money  
**Authors:** Fidel Torres, Professor, Universidad De Los Andes, Colombia  
Freddy Pérez, Student, Universidad De Los Andes, Colombia

We study the effect of time value of money in a single-setup multiple-delivery model for deteriorating items in a just-in-time, single buyer, single supplier environment. We propose a solution procedure by employing several multidimensional search methods without using derivatives, preparing a case study to illustrate the proposed model.

#### 065-1590
**Title:** Estimating Yield Distributions From Experts  
**Authors:** Genaro Gutierrez, Associate Professor, University of Texas Austin, United States  
Saurabh Bansal, Assistant Professor, Penn State University University Park, United States

We describe a novel econometric approach for estimating probability distributions using input from experts, outline its structural properties, and present observations from an implementation of the approach at a Fortune 500 firm for a large-scale annual investment decision.

### 16
**Session:** Humanitarian Logistics Applications with Case Studies  
**Track:** Humanitarian Operations and Crisis Management  
**Chair(s):** Hella Abidi

#### 065-0990
**Title:** Using Cases in Teaching Humanitarian Logistics  
**Authors:** Kate Hughes, University of Greenwich, United Kingdom  
Graham Heaslip, National University of Ireland, Maynooth, Australia

The use of cases in teaching operations management and supply chain management has grown in popularity as the “Harvard Method” has gained popularity. There are a range of factors involved in successful case teaching. We specifically discuss challenges in the experiential aspect of teaching cases in humanitarian logistics studies.

#### 065-0271
**Title:** Emergency Response Planning for Railroad Accidents Involving Hazardous Materials in Canada  
**Authors:** Ali Vaezi, Student, McMaster University, Canada  
Manish Verma, Associate Professor, McMaster University, Canada

We propose a mathematical model for strategic planning and tactical emergency response to railroad accidents involving hazardous materials. We solve this model over the Canadian railroad network, and provide recommendations on where to locate response facilities and how they are going to respond to hazardous materials emergencies under different scenarios.

#### 065-0995
**Title:** Compassionate Operations Management  
**Authors:** Richard Olorunto, , Newcastle University, Australia  
Kate Hughes, , University of Greenwich, United Kingdom

We advocate socially responsible and compassionate operations management in the context of responding to and managing natural disasters. We explore this concept using the case study of “Operation Recovery”, a generally accepted example of “best practice”, used in the response to Cyclone Larry in Australia (Williams et al. 2007).

#### 065-0995
**Title:** Demands for Tracking and Tracing in Humanitarian Supply Chains  
**Authors:** Vahid Mirzabeiki, Assistant Professor, Cranfield University, United Kingdom  
Hella Abidi, Lecturer, Nottingham Trent University, United Kingdom

The purpose of this paper is to identify the demands and issues regarding tracking and tracing the transported items through humanitarian supply chains, and to propose feasible solutions for the development of tracking and tracing systems for these supply chains based on the field requirements. The paper applies multiple-case studies method.

### 303
**Session:** Topics in OM-Marketing Interface  
**Track:** Marketing and Operations Management Interface  
**Chair(s):** Mikhail Nediak

#### 065-0934
**Title:** Price-Matching Competition in the Presence of Strategic Customers and Resale Price Maintenance  
**Authors:** Yossi Aviv, , Washington University St Louis, United States  
Andrei Bazhanov, , Queens University, Canada  
Yuri Levin, , Queens University, Canada  
Mikhail Nediak, , Queens University, Canada
Resale price maintenance (RPM) is treated as legal if it increases social welfare. We show that combination of RPM with price-matching (PM) improves welfare when customers are strategic. PM can lead to gain from increased strategic behavior or to “PM-traps,” with retailer profit less than the worst profit without PM.

065-0620 Quantity Competition in a C2C Exchange Market with Strategic Behavior and Dynamic Preferences
Sam Kirshner, Lecturer, University of New South Wales, Australia
Yuri Levin, Professor, Queens University, Canada
Mikhail Nediak, Associate Professor, Queens University, Canada

We consider a C2C exchange market where consumers maximize surplus by deciding the quantity of products to buy and sell in each period. We show that the equilibrium is unique and study the impact of strategic behavior and preference dynamics on the price path, quantities traded, and aggregate market surplus.

John Turner, Assistant Professor, University of California Irvine, United States
Vidyand Choudhary, Associate Professor, University of California Irvine, United States
Imran Curiim, Professor, University of California Irvine, United States
Sanjeev Dewan, Professor, University of California Irvine, United States
Ivan Jeliazkov, Associate Professor, University of California Irvine, United States
Ofer Mintz, Assistant Professor, Louisiana State University, United States

We estimate a copula model of evaluation set size and purchase behavior employing data from 3,182 hotel searches by customers at a large travel search engine. We jointly study purchase behavior, evaluation sets, and their antecedents. We show evaluation set size and purchase are negatively correlated, and discuss managerial implications.

065-1653 Turnpike Equilibrium for Oligopolistic Dynamic Pricing Competition with Strategic Consumers
Jue Wang, Lecturer, Queens University, Canada
Yuri Levin, Queens University, Canada
Mikhail Nediak, Associate Professor, Queens University, Canada

We consider a control-theoretic model for oligopolistic dynamic price competition when customers are making strategic repeated purchases. We show that the equilibrium has a turnpike property and characterizes its structure under both symmetric and asymmetric oligopolies. The impact of non-stationary demand is also examined.

065-0281 Sustainability from Consumers to Manufacturers
Amulya Gurto, Assistant Professor, University of Wisconsin, Green Bay, United States
Sampath Ranganathan, Associate Professor, University of Wisconsin, Green Bay, United States

This paper questions the premise that operations and supply chains need to be sustainable to improve the environment. Consumers’ psychology to replace a working product with a newer model and firms’ efforts to encourage that mindset are more responsible for environmental damage than effectiveness of the supply chain that produces these.

065-1249 Cars with Remanufactured Engines: Analysis of Chinese Consumers’ Acceptance
Muhammad Abdulrahman, Assistant Professor, The University of Nottingham Ningbo, China, China
Lars Bergkvist, Associate Professor, The University of Nottingham Ningbo, China, China
Nachagann Subramanian, Associate Professor, Nottingham University, Ningbo China, China
Dirk Moosmayer, Assistant Professor, The University of Nottingham Ningbo, China, China

The reception of cars with remanufactured engines by emerging economies’ consumers is not well known; nor are the types or models to remanufacture. Using consumer behavior and operations management literature and through 202 structured experiment observations, we present an outcome of remanufacturing for both producers and potential end consumers.

Luay Jum’a, Student, Brunel University - School of Business, United Kingdom
Ramzi El-Haddadeh, Senior Lecturer, Brunel University, United Kingdom

We propose a method to investigate logistics service quality (LSQ) and B2B customers’ satisfaction in order to prioritize strategic plans of third party logistics firms (3PLs) in supply chains. Based on a systematic literature review from well-known databases, we identify competitive advantages with priorities for logistics operation improvements.
065-0358  A Robust Model to Preposition Relief Supplies

Xinfang Wang, Associate Professor, Georgia Southern University, United States
Muer Yang, Assistant Professor, University of St. Thomas, United States

The number of natural catastrophes has increased significantly in the past 30 years in North America. Considering the demand uncertainty and network disruption, we develop a robust model to fairly pre-position relief supplies, and illustrate it on a case study of preparedness for hurricanes in the southeastern United States.

065-1064  Multi-methodology Applied to Pre-Positioning of Disaster Relief Supplies

Irineu Brito Jr, Lecturer, Universidade De Sao Paulo, Brazil
Adriana Leiras, Assistant Professor, Pontifica Universidade Catolica Do Rio De Janeiro- Puc Rio, Brazil
Hugo Yoshizaki, Associate Professor, University of Sã£o Paulo, Brazil

We propose a multi-methodology to define locations for pre-positioning disaster relief supplies through a two-stage stochastic optimization model and multi-criteria decision analysis. A detailed analysis on how to assign penalties for unmet demand is also presented. An application in Brazil illustrates the effectiveness of the proposed approach.

065-1074  Metrics of Efficacy for Humanitarian Logistics

Yasutaka Kainuma, Associate Professor, Tokyo Metropolitan University, Japan
Yacob Khojasteh, Associate Professor, Sophia University, Japan
Takeo Kobayashi, Student, Tokyo Metropolitan University, Japan

We investigate and design the metric of efficacy to minimize distribution time to each shelter. We propose the model of the metric of efficacy and investigate the efficiency of the proposed metric comparison between the results of efficacy and efficiency for humanitarian logistics.

065-0726  Approach of the Requirements for the Management of Suppliers by Retailers of Fast Fashion: Case Study

Rita Moro, Student, University of Sâ£o Paulo, Brazil
Camila Marcelo, Student, Universidade De Sao Paulo, Brazil
Francisca Mendes, Professor, Universidade De Sao Paulo, Brazil

The fast fashion industry has been showing actions aimed at reducing environmental impacts in its supply chain. The selection of suppliers is one of the options used. Therefore, this article aims to explore the requirements used by a Brazilian retailer to manage their supply chain.

065-0648  Consumer Reactions to Supply Chain Events

Christoph Schmidt, Student, Ebs Business School, Germany
We conduct sentiment analysis on Twitter data to evaluate consumer reactions to supply chain events.

**065-0146** The Suppliers’ Strategic Choices in a Retailer-Dominated Supply Chain
Chao Wang, Student, Huazhong University of Science & Technology, China
Chao Yang, Huazhong University of Science & Technology, China

This paper analyzes how the suppliers can make the right strategic choices in a retailer-dominated supply chain. Their profits can be improved through cooperation. The results show that based on the cooperation mechanism of joint pricing, suppliers can adjust the demand-price elasticity to compensate for their disadvantage in the supply chain.

**065-1897** Revenue Sharing Contract for Single Period Inventory System with Stochastic and Shelf Space Dependent Demand
Neha Advani, Student, Indian Institute of Management Bangalore, India
Devanath Tirupati, Professor, Indian Institute of Management Bangalore, India

We consider a two player supply chain with one manufacturer and one retailer for a product with shelf space dependent demand in a newsvendor setting. We examine the role of revenue sharing contracts in coordinating this supply chain. We derive managerial insights based on structural results and computational studies.

**065-0975** Product Quality and the Value of Asymmetric Information under Supplier-Specified Contracts
Narendra Singh, Assistant Professor, Indian School of Business, India
Stylianos Kavadias, University of Cambridge, United Kingdom
Ravi Subramanian, Associate Professor, Georgia Institute of Technology, United States

We study an OEM’s optimal product design quality and sourcing strategies in a supply chain consisting of an OEM who has in-house option and a supplier who has more favorable cost structure and the power to dictate contract terms.

**065-1982** Capacity Allocation with Asymmetric Market Powers and Demand Competition
Jianbin Li, Professor, Huazhong University of Science & Technology, China
Niu Yu, Student, Huazhong University of Science & Technology, China
Zhixin Liu, Associate Professor, University of Michigan Dearborn, United States

We examine capacity allocation mechanisms in a two-echelon supply chain with asymmetric market powers and demand competition under uniform, proportional or lexicographic mechanisms. We study the impact of mechanisms on supplier pricing and retailer ordering behavior. Our results show that the lexicographic mechanism is the best choice for the supplier.

**065-0347** Dynamic Assignment of Emergency Department Patients to Primary and Secondary Inpatient Units
Derya Kiilinc, Student, Arizona State University Tempe, United States
Sorosh Saghaifan, Assistant Professor, Harvard University, United States
Stephen Traub, Department of Emergency Medicine Chair, Mayo Clinic, United States

One of the main reasons for emergency department crowding is the boarding time of patients who are waiting for admission to inpatient wards. We study suitable mechanisms to overflow such patients to alternative wards. We present an MDP-based approach to gain insights into the impact of overflow policies.

**065-0417** An Analytical Framework for Specialist Care in Rural Hospitals
Vedat Verter, Professor, Mcgill University, Canada
Michael Klein, Student, Mcgill University, Canada
Hughie Fraser, Department Head, South Shore Health, Canada
Brian Moses, Chief of Medicine, South West Health, Canada

Patients often wait in the emergency department for admission to inpatient wards, resulting in crowding and adverse health outcomes. We study the Internal Medicine specialists at two hospitals in Nova Scotia, Canada. We propose a stochastic dynamic programming model to analyze current practice and identify strategies for improvement.

**065-0715** Yardstick Competition for (Emergency Department) Queues
Nicos Savva, Assistant Professor, London Business School, United Kingdom
Tolga Tezcan, Associate Professor, London Business School, United Kingdom
Ozlem Yildiz, Student, Simon Business School, United States

We study whether an alternate pay-for-performance method can alleviate ED overcrowding through incentivizing socially-desired ED capacity levels, although the healthcare regulator does not know the capacity cost structure. Using yardstick competition, we propose a regulatory scheme that achieves this using the wait time and arrival rate information of each ED.

**065-0602** Proactive Coordination Between Emergency Department and Inpatient Units
Seung Yup Lee, Student, Wayne State University, United States
Ratna Babu Chinnam, Professor, Wayne State University, United States

A major reason for severe crowding and prolonged waiting times in Emergency Departments (EDs) in hospitals is boarding delay. Research suggests that proactive coordination between ED and inpatient units can help with the mitigation of this issue. We present results using data from a VA Medical Center.
### 065-1912 Reducing Anxiety and Readmissions: An Empirical Investigation in the Context of Kidney Transplant Recipients
Gopesh Anand, Associate Professor, University of Illinois Urbana-Champaign, United States
Aravind Chandrasekaran, Associate Professor, Ohio State University, United States
Luv Sharma, Student, Ohio State University, United States

We examine the relationship between quality of self-care instruction delivered during patients' hospital stay and health outcomes. Testing hypotheses generated based on the extant literature using data from a major transplant center in the United States, our research offers insights on reducing readmissions by addressing anxiety levels for chronic patients.

### 065-0772 Measuring Performance of Integrated and Flexible Health Care Operations: A Petri-Net Based Approach
Jitender Madaan, Assistant Professor, Indian Institute of Technology Delhi, India
Din Dayal Agrawal, Student, Indian Institute of Technology Delhi, India

We propose a Petri-Net framework for improving healthcare operations by reducing delays experienced by patients. We introduce flexibility in patient flow so that unnecessary waits can be avoided; we also suggest integration of medical and paramedic services for improvements in medical performance, patient satisfaction, and access to service.

### 065-1736 On The Pooling Of Queues: How Server Behavior Affects Performance
Hung Do, Assistant Professor, University of Vermont, United States
Masha Shunko, Assistant Professor, Purdue University, United States
Marilyn Lucas, Associate Professor, University of Vermont, United States
David Novak, Associate Professor, University of Vermont, United States

It is widely accepted that multi-server single-queue (SQ) systems outperform multi-server parallel-queue (PQ) systems due to the pooling effect. We model and analyze the impact of server behaviors (i.e., social loafing and workload-dependent service rate) on the performance of SQ and PQ systems.
Using a data set collected from an online retailer, we empirically study consumers’ purchasing behavior is impacted by the information disclosed to customers.

**065-0761 Which Drivers Should Transport Your Cargo? Empirical Evidence from Long-Haul Transport**
Jelle De Vries, Assistant Professor, Vrije Universiteit Amsterdam, Netherlands
René De Koster, Professor, Rotterdam School of Management, Netherlands
Debjit Roy, Assistant Professor, Indian Institute of Management Ahmedabad, India
Serge Rij dendijk, Assistant Professor, Rotterdam School of Management, Netherlands

Using a combination of GPS, survey, and ERP data, this study examines the role of individual driver characteristics (safety consciousness and personality in particular) in predicting risky driving behavior and productivity. Operations managers can use these results in the training and selection of drivers to meet their operational objectives.

**065-0712 Antecedents of Fuel Efficiency**
Kenneth Schultz, Professor, Air Force Institute of Technology, United States
James Cotton, Student, Air Force Institute of Technology, United States
Joshua Strakos, Assistant Professor, Air Force Institute of Technology, United States
Reidar Hagtveld, Associate Professor, University of Alberta, Canada

Some pilots fly more fuel efficiently than others. We would like to find out why. In doing so we contribute to the literature on motivation of proenvironmental behavior in job performance. We survey USAF pilots on different Attitudes, Behavioral Control, Norms and Habits to correlate with historical flying behavior.

---

**065-0385 Who Am I? Group Identity in Buyer-Supplier Relationships**
Siqi Ma, Student, University of Arkansas - Fayetteville, United States
John Aloysius, Associate Professor, University of Arkansas, United States

In a decentralized system, decisions of self-interested agents are suboptimal because they seek to achieve local objectives. Group identity, a sense of self derived from perceived membership in social groups, has been shown to motivate agents. We experimentally study how induced group identity influences buyer-supplier collaboration and operational performance.

**065-1050 Online Shopper Behavior in Response to a Delivery Carrier Upgrade and Subsequent Shipping Charge Increase**
Travis Tokar, Associate Professor, Texas Christian University, United States
Brent Williams, Assistant Professor, University of Arkansas, United States
Brian Fugate, Associate Professor, University of Arkansas, United States

We examine online shopper behavior when a retailer attempts to improve delivery service by switching to a more highly perceived, yet more expensive, delivery carrier.

**065-1068 The Impact of Operational Fulfillment Ambidexterity on Retail Firm Performance**
Simone Peinkofer, Student, University of Arkansas - Fayetteville, United States
Terry Esper, Associate Professor, University of Arkansas - Fayetteville, United States
Brent Williams, Associate Professor, University of Arkansas, United States
Ronn Smith, Associate Professor, University of Arkansas, United States

With the shift towards an omni-channel retail environment retailers develop and adopt new fulfillment operations to meet increasing end-customer expectations. We use archival data and regression methods to report the effect of omni-channel fulfillment operations on retail supply chain efficiency and effectiveness.

**065-0873 Effect of Inventory Leanness on Retailers Efficiency**
Howard Hao-Chun Chuang, Assistant Professor, National Chengchi University, Taiwan, Republic of China
Yating Feng, Student, Texas A&M University College Station, United States
Rogelio Oliva, , Texas A&M University College Station, United States
Gregory Heim, , Texas A&M University College Station, United States

Pursuing "lean retailing," U.S. retailers have made efforts to reduce inventory levels. However, it is not clear the impact this reduction has on sales. Using a sample of U.S. retailers and a stochastic frontier analysis, we empirically assess the impact of inventory leanness on retailer operating efficiency.

---

**065-2080 Corporate Session: Using a new online game to teach sourcing and strategy**
Sam Wood, President, Responsive Learning Technologies, United States

The Gleacher Game is a new competitive online simulation where students build firms to design, produce, distribute, and sell wearable monitors. Teams collaborate, and compete with each other. We describe the game, its use in a Sourcing course at Johns Hopkins University, and its use in an Integrated Strategic Management course at the University of Chicago.

---

**065-0470 Online Shopper Behavior in Response to a Delivery Carrier Upgrade and Subsequent Shipping Charge Increase**
Travis Tokar, Associate Professor, Texas Christian University, United States
Brent Williams, Assistant Professor, University of Arkansas, United States
Brian Fugate, Associate Professor, University of Arkansas, United States

We examine online shopper behavior when a retailer attempts to improve delivery service by switching to a more highly perceived, yet more expensive, delivery carrier.

**065-1068 The Impact of Operational Fulfillment Ambidexterity on Retail Firm Performance**
Simone Peinkofer, Student, University of Arkansas - Fayetteville, United States
Terry Esper, Associate Professor, University of Arkansas - Fayetteville, United States
Brent Williams, Associate Professor, University of Arkansas, United States
Ronn Smith, Associate Professor, University of Arkansas, United States

With the shift towards an omni-channel retail environment retailers develop and adopt new fulfillment operations to meet increasing end-customer expectations. We use archival data and regression methods to report the effect of omni-channel fulfillment operations on retail supply chain efficiency and effectiveness.

---

**065-0873 Effect of Inventory Leanness on Retailers Efficiency**
Howard Hao-Chun Chuang, Assistant Professor, National Chengchi University, Taiwan, Republic of China
Yating Feng, Student, Texas A&M University College Station, United States
Rogelio Oliva, , Texas A&M University College Station, United States
Gregory Heim, , Texas A&M University College Station, United States

Pursuing "lean retailing," U.S. retailers have made efforts to reduce inventory levels. However, it is not clear the impact this reduction has on sales. Using a sample of U.S. retailers and a stochastic frontier analysis, we empirically assess the impact of inventory leanness on retailer operating efficiency.

---

**065-2080 Corporate Session: Using a new online game to teach sourcing and strategy**
Sam Wood, President, Responsive Learning Technologies, United States

The Gleacher Game is a new competitive online simulation where students build firms to design, produce, distribute, and sell wearable monitors. Teams collaborate, and compete with each other. We describe the game, its use in a Sourcing course at Johns Hopkins University, and its use in an Integrated Strategic Management course at the University of Chicago.
The Implications of Extended Warranties on a Closed-Loop Supply Chain

Chair(s): Ximin (Natalie) Huang
Session: Product Design for Remanufacturing
Track: Closed-Loop Supply Chains

Extended warranties often involve travel by medical teams and distribution of medical supplies. The coordination of medical teams and supplies is critical. We introduce a mathematical programming based rolling horizon heuristic to quickly find near-optimal solutions and draw managerial insights. A polynomial time solvable case is also discussed.

Managing Change Revenue with Presence of Time-Uncertain Customers

(MCKP).

The number and be considered hard on an algorithm present instances. We develop an assignment problem model for worker to job assignments that deviates as little as possible from a shift supervisor's allocation of these workers. These deviations occur due to worker absences. In addition to validating the model over four weeks of data, we investigate a number of what-if scenarios.

Dynamic Pricing of Multiple Substitutable Products in the Presence of Consumers' Sequential Search

We consider a dynamic pricing setting where a seller offers several substitute perishable products over several periods. In each period consumers sequentially search for and buy the best product. We show that, unlike the conventional revenue management literature, a perishable product's price may increase with lower number of remaining periods.

Personnel Scheduling and Supplies Provisioning in Emergency Relief Operations

We study a hand-intensive production flowshop with variable workers productivity. Actual processing times of jobs are assumed to vary depending on their position in the schedule. A mathematical model is proposed and computational experiments are run using different datasets to test models power (efficiency and efficacy) to solve the problem.

Planning Online Advertising Using Lorenz Curves

Lorenz curves are commonly used to depict dispersion, e.g., income inequality. Motivated by online advertising campaigns that desire impressions spread over targeted audience segments and time, we formulate a problem that minimizes Gini Coefficients (area under the Lorenz curve), and develop a specialized decomposition technique to solve instances quickly.

Managing Change Revenue with Presence of Time-Uncertain Customers

We study the significance of ancillary revenue for industries such as airlines. We focus on the dynamics between a firm and customers who are uncertain about their future travel plans and analytically derive each market player's best reaction to the other.

Large-Scale Bid Optimization in Online Advertising Auctions

In sponsored search ads, advertisers have to decide on keywords and positions to bid on given a budget, which can be modeled as the Multiple Choice Knapsack Problem (MCKP). The number of keywords considered can be very large. We present an efficient algorithm and present results on hard instances.

The Implications of Extended Warranties on a Closed-Loop Supply Chain
We formulate a stylized model that explores the interaction between a producer’s warranty offerings and buy-back programs in a durable goods setting. We characterize a complex relationship between product failure rates, buy-back programs and the profitability of extended warranties and identify market conditions for profitable coupling of buybacks and extended warranties.

**065-0439**  
A Framework to Measure the True Impact of Take-Back Legislation  
Megan Jauich, Student, North Carolina State University, United States  
Hadi Gashiri, Student, North Carolina State University, United States  
Joe DeCarolis, Assistant Professor, North Carolina State University, United States  
Robert Handfield, Professor, North Carolina State University, United States  
Eva Kemeniologlu-Ziya, Assistant Professor, North Carolina State University, United States  
Ranjit Ranjithan, Professor, North Carolina State University, United States

We develop a process model of returned product recycling under take-back legislation. We use data from this model to develop a framework and an optimization model to measure the cost and environmental impact of take-back legislation.

**065-0470**  
The Effect of Refurbished Products’ Quality on Recycling Incentive Strategies under Retailer Take-Back Mode  
Xiaoyan Wang, Student, Huazhong University of Science & Technology, China  
Weilai Huang, Professor, Huazhong University of Science & Technology, China

We study the effect of quality of refurbished products on recycling incentive strategies under retailer take-back mode. In considering refurbished products' quality, we propose the revenue sharing and cost sharing strategies, and find these strategies do improve the return rate and that quality really influences the recycling incentive strategies.

**065-1880**  
When Remanufacturing Meets Product Innovation  
Gendao Li, Senior Lecturer, Northumbria University, United Kingdom  
Marc Reimann, Professor, University of Graz, Austria

The coexistence of remanufactured and newly manufactured products in the market makes remanufacturing decisions also interact with the optimal timing of introducing new and innovative products. Our research focuses on analyzing the relationship between innovation and remanufacturing decisions, and identifies what strategies are optimal under different conditions.

**065-0933**  
Lemons, Trade-Ins, and Remanufacturing  
Ximin (Natalie) Huang, Georgia Institute of Technology, United States  
Atay Atasu, Georgia Institute of Technology, United States  
Beril Toktay, Georgia Institute of Technology, United States

Trade-in programs have been shown to partially mitigate the lemons problem in secondary markets. We show when and how remanufacturing traded-in products can further improve the efficiency in secondary markets.

**065-0026**  
Improving Productivity of Solid Waste Recycling Centers Through Lean Implementation: A Comparative Analysis  
Guilherme Tortorella, Assistant Professor, Federal University of Santa Catarina, Brazil  
Guilherme Lima, Assistant Professor, Federal University of Santa Catarina, Brazil  
Lucila Campos, Associate Professor, Federal University of Santa Catarina, Brazil

This paper reports a comparative analysis of lean implementation for productivity improvement in five recycling centers that sort MSW in Brazil. We find that cultural and social characteristics represent an incremental challenge for lean implementation due to labor sources drawn from impoverished communities.

**065-0276**  
Recyclable material pickers cooperative operations  
Rafael Jorge, Assistant Professor, Universidade Federal do ABC, Brazil  
Julio FAc, Professor, Universidade Federal do ABC, Brazil

We analyze the division of labor and work organization in a recyclable material pickers cooperative. We relate concepts from the sustainability and reverse supply chain literature to observations from the operation and work relations among pickers inside the cooperative.

**065-0302**  
Collaboration for Sustainable Operations  
Jen-Yi Chen, Assistant Professor, Cleveland State University, United States

We analyze a firm's decision on how to collaborate for more sustainable operations by exploring the following two questions: What collaborative strategy should the firm adopt? and How external market factors affect internal supply chain strategic decisions? Managerial implications are discussed.

**065-0730**  
When to Choose a Socially Responsible Supplier  
Wenqing Zhang, Assistant Professor, University of Minnesota Duluth, United States  
Chung-Yean Chiang, Assistant Professor, Georgia Southern University, United States

A company's social image plays an important role in developing or maintaining the competitive edge. We examine the pricing and sourcing choices in a two-echelon supply chain selling a procure-to-stock product to price-sensitive and socially conscious consumers.

**065-0766**  
Public Participation and Social Evaluation in Adaptive Water Management Adoption: An Empirical Study  
Wayne Fu, Student, Georgia Institute of Technology, United States  
Atay Atasu, Associate Professor, Georgia Institute of Technology, United States

We formulate a stylized model that explores the interaction between a producer’s warranty offerings and buy-back programs in a durable goods setting. We characterize a complex relationship between product failure rates, buy-back programs and the profitability of extended warranties and identify market conditions for profitable coupling of buybacks and extended warranties.
We evaluate public participation, an essential characteristic of Adaptive Water Management, through a MCDA tool in a case study. Synthesized analysis of elements interconnecting a water company and consumers highlights how consumers' anti-policy behavior is affected by a lack of information or communication and trust issues.

**065-1131 A Cutting Stock Problem with Random Stock Size**
Ali Reza Sabouri, Assistant Professor, University of Calgary, Canada
Yahya Fathi, Professor, North Carolina State University, United States

We introduce the cutting stock problem with random stock length in the context of a wood processing operation. We propose a mathematical programming model and study its structure and properties, develop a column generation scheme for solving this problem, and present the numerical results.

**065-1410 A Study of the Primary Raw Material Supply Chain for Coal at a Mining Company: SAP-LAP Analysis**
Parikshit Charan, Assistant Professor, Indian Institute of Management Raipur, India
Jitender Madaan, Assistant Professor, Indian Institute of Technology Delhi, India
Anand Mandrik, Manager-Coal Logistics, BALCO, India

We analyze the supply chain of coal, the primary raw material of a mining company, applying a SAP-LAP framework. We propose an efficient supply chain while highlighting the opportunities to optimize logistics in the supply chain network.

**065-1364 A Study of the Primary Raw Materials Supply Chain (Bauxite and Alumina) in a Mining Company: A SAP-LAP Analysis**
Parikshit Charan, Assistant Professor, Indian Institute of Management Raipur, India
Jitender Madaan, Assistant Professor, Indian Institute of Technology Delhi, India
Abhishek Bajpai, Associate Manager, BALCO, India

We analyze the supply chain of bauxite and alumina, a mining company's primary raw materials, and apply SAP-LAP framework to analyze how the firm could gain a competitive edge in the industry.

**065-1485 Procurement Policies for Mobile-Promotion Platforms**
Mannmohan Aseri, Student, University of Texas Dallas, United States
Milind Dawande, Professor, University of Texas Dallas, United States
Ganesh Janakiraman, Professor, University of Texas Dallas, United States
Vijay Mookerjee, Professor, University of Texas Dallas, United States

Mobile-Promotion Platforms such as Cidewalk enable businesses to offer personalized advertising campaigns. A campaign requires the delivery of a certain number of impressions on mobile apps in specified geographic locations and time windows. We study the platform's bidding strategy for procuring impressions for all the campaigns at minimum cost.

**065-1489 An Examination of EHR Implementation Impacts on Operational Processes and Productivity**
Su Dong, Assistant Professor, Fayetteville State University, United States
Lee Brown III, Fayetteville State University, United States
Jennifer Bushelle-Edgehill, Assistant Professor, Fayetteville State University, United States

Issues surrounding implementation and use of these EHRs often translate into losses in financial revenues, and workflow and operational inefficiency. We examine the evolution of adoption of a new EHR system and how different users adjust to the implementation and deployment of subsequent changes.

**065-1717 Knowing What Your Customer Wants: Improving Inventory Allocation Decisions in Online Movie Rental Systems**
Yasin ceran, Assistant Professor, Santa Clara University, United States
Harpreet Singh, Assistant Professor, University of Texas Dallas, United States
Vijay Mookerjee, Professor, University of Texas Dallas, United States

In Online Movie Rental Systems, customer desire to rent can often be observed before the actual consumption occurs. Desire represents uncensored (or true) demand information. We used data to estimate the impact of inventory decisions on generating demand. We compared desire with actual sales.

**065-1858 Logistics Service Quality in Vietnam**
Tung Nguyen, Lecturer, International University - Vietnam National University Ho Chi Minh City, Vietnam

Our survey of 227 logistics customers shows that customer loyalty is directly and positively predicted by perceived customer service satisfaction and indirectly by information technology. These findings are helpful in directing the attention of Vietnam's logistics managers to recognition of the importance of service quality in addition to information technology investment.

**065-2059 Panel: Emerging Research Directions in the Internet of Things**
Vijay Mookerjee, Professor, University of Texas Dallas, United States
Ravi Bapna, Venkat Atluri, Venkat Atluri

In this panel we propose to discuss topics and methods that have the most potential in driving business research in the area of Internet of Things.
**Session: Scheduling and inventory in manufacturing**

**Chair(s):** Bram De Jonge

**065-1318 A Proactive Approach to Kanban Allocation in Stochastic and Time-Dependent Flow Lines**

Justus Schwarz, Student, University of Mannheim, Germany
Raik Stolletz, Professor, University of Mannheim, Germany

To account for time-dependent machine characteristics in flow lines, we propose a time-dependent change in Kanban cards to minimize the required work-in-process while maintaining a predefined gamma service level over a finite planning horizon. Moreover, we provide examples that demonstrate the advantages of time-dependent, as compared to constant allocations.

**065-1275 Mining the Shop Floor in Real Time: Challenges, Architectures, and Algorithms for Manufacturing Intelligence**

Uwe Bachmann, Lecturer, Jade Hochschule, Germany
Christoph Wunck, Professor, Jade University of Applied Sciences, Germany

Machines on the shop floor generate an ever-growing abundance of data in time intervals as short as milliseconds. In order to benefit from the information hidden in this flood of data, we apply sophisticated methodologies and algorithms to extract relevant information from shop floor data in real time.

**Session: Product development and process improvement in healthcare**

**Chair(s):** Zhili Tian

**065-0432 Evaluating the Implementation Effectiveness of CDS Systems: The Role of Health Care Provider Capability**

Xiaojin Liu, Student, University of Minnesota, United States
Susan Goldstein, Associate Professor, University of Minnesota, United States
Karen Soderberg, Assessment and Evaluation Coordinator, Minnesota Department of Health, United States
Kingshuk Sinha, Professor, University of Minnesota, United States
Karen Soderberg, Assessment and Evaluation Coordinator, Minnesota Department of Health, United States

We investigate enablers and barriers to developing the capabilities of health care providers to use Clinical Decision Support (CDS) systems to deliver high quality and cost effective care. We empirically test an integrative framework on the interplay between the capability of physicians and nurses, CDS, and health care delivery effectiveness.

**065-0450 Optimal Product Launch Times for a Small Firm in a Competitive Environment**

Jacqueline Ng, Student, Northwestern University, United States
Seyed Irvani, Professor, Northwestern University, United States
Izak Duenyas, Professor, University of Michigan Ann Arbor, United States

We consider the optimal product introduction policy for a small firm in a competitive environment that produces a single base product with multiple product generations over time. We develop a dynamic programming model to analyze the small firm’s new product introduction strategy, and prove the optimality of a threshold policy.

**065-0926 Optimal Investment in Phase II and III of New Drug Development**

Zhili Tian, Florida International University, United States

Firms conduct Phase 2 and 3 trials by enrolling and treating patients. Finding these patients is expensive and time-consuming, with uncertainty. We develop model to jointly optimize the investment in Phases 2 and 3 trials.

**Session: Technology and Innovation Management**

**Chair(s):** Xueyuan Liu

**065-0346 Technology Transfer in Equipment Acquisition: An Exploratory Study in the Brazilian Textile Industry**

Wagner Lucato, Professor, Universidade Nove De Julho, Brazil
Ariane Sanches, Student, Universidade Nove De Julho, Brazil

This paper aims to develop an exploratory evaluation of Brazilian textile companies to identify common technology transfer practices being currently used in equipment acquisition. This was done through a multi-firm case study that allowed the identification of best practices intended to improve the technology transfer process in textile companies.

**065-1990 Innovation and Business Performance: The Mediating Roles of Mass Customization and Absorptive Capacity**

Xueyuan Liu, Professor, Wuhuan University, China
Xiande Zhao, Professor, China Europe International Business School, China
Kenneth Boyer, Professor, Ohio State University, United States
We examine the multiple influential paths of innovation on business performance. Data from 233 Chinese firms in four manufacturing industries suggest that mass customization capability has a stronger effect than absorptive capacity on the relationship between innovation and business performance.

**065-0233 R&D Investments, Profitability and Firm Risks: The Moderating Role of Operational Capability**

Luk Man Daphne Yiu, Student, The Hong Kong Polytechnic University, China
Andy Yeung, Professor, The Hong Kong Polytechnic University, China

Although R&D investments create long-term competitive advantage, they cause significant short-term financial stress in terms of lower ROA and higher financial risks to firms due to immediate increases in expenditures and uncertain return periods. Our longitudinal analysis finds that operational capability is the key to this issue through organizational learning.

**065-1003 Exploring a Supplier’s Collaborative Competence on New Product Development Performance**

Daesik Hur, Associate Professor, Yonsei University, Korea, Republic of (South Korea)
Hyojin Kim, Student, Yonsei University, Korea, Republic of (South Korea)
Sunil Hwang, Lecturer, Yonsei University, Korea, Republic of (South Korea)

Based on a knowledge-based view and a motivation-opportunity-ability (MOA) framework, we suggest a supplier’s collaborative competence in new product development as a second order construct of the supplier’s relational embeddedness, communication routines, and relative absorptive capacity with the buyer firm. The effects of the collaborative competence are empirically substantiated.

**065-1408 The Use of Indicators to Measure the Performance of Logistics Services in a Steel Industry**

Mauricio Molinho, Student, Universidade Santa Cecília, Brazil
Helier Chagas, Student, CEEETEPs, Brazil
Mariana Cristina Matos, Professor, Universidade Santa Cecília, Brazil
Renata Oliveira, Student, CEEETEPs - Centro Estadual de Educação Tecnológica Paula Souza, Brazil
Jair Souza, Student, SENAC - Serviço Nacional de Aprendizagem Comercial - Santos/SP, Brazil
Valmir Moura, Student, CEEETEPS - Centro Estadual de Educação Tecnológica Paula Souza, Brazil

We demonstrate, through literature, research, and a case study in a steel industry, the importance of performance indicators, particularly OTIF, to assess the procurement process. The results show that suppliers’ performances were improved after adoption of OTIF indicator, not only reaching but exceeding the set target.

**065-2034 The Design of a Contemporary Automotive Supplier Performance Management System**

Carsten Gast, Head of Strategic Planning & Controlling, Yazaki Europe Limited, Germany
M Reza Abdi, Assistant Professor, Bradford University, United Kingdom

This study conceptualizes a customized Performance Management System (PMS). The PMS satisfies both financial and key operational management requirements for steering the business of a globally leading automotive supplier and thereby enriches the literature of contemporary PMS design and application in the context of challenges imposed by a heterogeneous IT environment.

**065-1819 Supply Base Structural Complexity and Its Impacts on Financial Performance**

Guanyi Lu, Assistant Professor, Oregon State University, United States
Guangzhi Shang, Assistant Professor, Florida State University, United States

We examine the impact of supply base structural complexity on financial performance. Using objective data of supply base configuration of the electronics industry, we find that the five complexity dimensions (horizontal, vertical, spatial, cooperative and competitive) exhibit differential effects; horizontal and cooperative complexity reveal stronger impacts compared to others.

**065-1962 Effect of E-Procurement on Business Performance**

Cristobal Sanchez-Rodriguez, Associate Professor, York University, Canada
Angel Martinez-Lorente, Professor, Universidad de Murcia, Spain
David Hemsworth, Professor, Nipissing University, Canada

Based upon the dynamic capability theory, we argue that e-procurement is positively related to a firm’s business performance. Using a sample of 199 managers from manufacturing companies, we tested hypotheses and the results indicated that e-procurement is positively related to a firm’s commercial and financial business performance.

**065-0233 A Price-Setting Retailer Sourcing from Strategic Suppliers Facing Disruption**

Xi Shan, Student, University of Texas Dallas, United States
We study the case of a price-setting retailer who sources from two strategic suppliers subject to independent disruption and sets the retail price upon delivery. We model this case as a Stackelberg-Nash game with the suppliers as the leaders and the retailer as a follower.

This paper examines the relationships among flexibility, agility, and visibility in a supply chain under risk of disruptions. Based on the review of the literature, a conceptual model is developed to address flexibility-agility-visibility-responsiveness relationships, which are further examined using hypotheses testing and analytical modeling (heuristic algorithm).

We present a new maturity model approach, proposing a matrix to diagnose and measure the Organizational Risk Maturity in a simplified and friendly way. It was previously tested in three companies, and we present in this paper the results of research in fifty companies operating in Brazil.

We demonstrate that both the disrupted party and her competitor benefit from the disrupted party’s outsourcing from her competitor. The disrupted party outsources to hedge against the unexpected disruption and earns higher profits compared to no outsourcing in the event of disruption. More interestingly, the competitor’s centralized decision making is preferred.

We empirically examine the impact of a category captainship implementation performed by a large U.S. grocer on various parties involved, including the retailer, the captain, and the competing manufacturers. Our findings verify some of the hypotheses developed in the relevant theoretical literature and refute others.

We empirically examine the relationship between the environmental initiatives and outcomes of a firm’s supply chain partners and firm performance. We draw from environmental, financial, and supply chain data to identify key mechanisms related to the environmental health of a firm’s supply chain that influence its economic performance.

Product expiration is an important problem in the consumer packaged goods industry with substantial impact on the environment and profits of firms. We found that shelf life erosion is one of the drivers of expiration. In this study, we establish shipment policies for manufacturers to address the shelf life erosion.

We investigate the sustainable management of green corridors for environmental benefits, achieved by the model applied in the European transport market. Exploratory research within the Brazilian environmental model suggests regulatory measures for a case study of eco-efficiency in green corridors for multimodal transport of international cargo.

Current literature discusses many aspects of operations in port cities - among them, the sustainable development agenda and its relation to a port's efficiency and productivity. We identify regional sustainability variables that can influence the operational performance of the Port of Santos in Brazil.

We discuss the impact of visibility, flexibility and agility on responsiveness in a supply chain under demand risk.
### Sunday, 02:30 PM - 04:00 PM

- **065-1130** Water Use Management in the Mining Industry: A Comparison Based on Company Size  
  Claudia Gomes, Professor, Santa Maria Federal University, Brazil  
  Roberta Bichueti, Student, Santa Maria Federal University, Brazil  
  Isak Kruglianskas, Professor, Universidade De Sao Paulo, Brazil  
  Jordana Kneipp, Student, Santa Maria Federal University, Brazil  
  Beatriz Gomes, Student, Santa Maria Federal University, Brazil  
  We seek to identify the association between company size and water use management in the Brazilian mining industry, highlighting significant differences between these enterprises with respect to water use management and suggesting that smaller firms adopt less-advanced management practices.

- **065-1737** A Systematic Literature Review of Industrial Energy Efficiency: An Integrative Framework  
  Marcos Perroni, Student, Pontifical Catholic University of Parana, Brazil  
  Sergio Gouvea da Costa, Professor, Pontifical Catholic University of Parana, Brazil  
  Edson Pinheiro de Lima, Associate Professor, Pontifical Catholic University of Parana, Brazil  
  Wesley da Silva, Professor, Pontifical Catholic University of Parana, Brazil  
  We present the results of a systematic literature review in the field of industrial energy efficiency, from a perspective of energy management. We propose an integrative framework for how energy management can be considered with regard to both the company and the chain.

### 422 Sunday, 02:30 PM - 04:00 PM, Dogwood  
**Session:** Behavioral Operations  
**Track:** Behavior in Operations Management  
**Chair(s):** Milind Padalkar

- **065-1046** Supply Base Diversification In The Presence Of Supply Disruptions  
  Kyle Goldschmidt, Assistant Professor, University of St. Thomas, United States  
  Doug Thomas, Professor, Penn State University University Park, United States  
  Mirko Kremer, Professor, Frankfurt School of Finance & Management, Germany  
  Christopher Craighead, Professor, University of Tennessee Knoxville, United States  
  We investigate sourcing decisions in the presence of supply disruptions. Our model examines a critical procurement tradeoff: a consolidated supply base reduces transaction costs, but increases the exposure to disruptions. We predict an oscillating pattern - supplier diversification immediately after a severe disruption and consolidation during stretches without disruptions.

- **065-0775** Changing Supply Chains in the Era of Volatility - A Multiple Case Study  
  Jarmo Toivanen, Senior Lecturer, Aalto University, Finland  
  In this multiple case study, supply chain management and operations management in the Finnish industry during the 2010s were studied. The objective was to resolve what kind of capabilities are being required from a company to succeed globally and how they see the winning criteria’s in this era of volatility.

- **065-1037** Controlling Deviant Behaviors in Employee-Owned Cooperatives  
  Milind Padalkar, Student, Indian Institute of Management Kozhikode, India  
  Saji Gopinath, Professor, Indian Institute of Management Kozhikode, India  
  Abhilash Kumar, Chief Executive, ULCCS Ltd., India  
  Controlling deviant behaviors is difficult in employee-owned cooperatives especially when such cooperatives are engaged in project business. From a case study of a high performance construction cooperative, we find that social conventions, peer group pressure, and member welfare initiatives can lead to substantially low management overheads for controlling deviant behaviors.

### 424 Sunday, 02:30 PM - 04:00 PM, Pantor 274  
**Session:** Stochastic Inventory Models  
**Track:** Inventory Management  
**Chair(s):** Ton de Kok

- **065-1555** Spare Parts Planning for Two-Echelon Networks with Lateral and Emergency Shipments  
  Erwin Wingerden, Student, Technische Universiteit Eindhoven, Netherlands  
  Geert-Jan van Houtum, Professor, Technische Universiteit Eindhoven, Netherlands  
  We present a spare parts inventory model for two-echelon spare parts networks with lateral and emergency shipments consisting of a central warehouse and local warehouses near the customer(s). We develop a fast approximate evaluation method which can be used to optimize the inventory levels of real-life spare parts networks.

- **065-1558** Spare Part and Maintenance Optimization for Moving Assets  
  Aysa Sena Eruguz, , Eindhoven University of Technology, Netherlands  
  Geert-Jan van Houtum, Professor, Technische Universiteit Eindhoven, Netherlands  
  We consider an integrated spare part and maintenance planning problem for a single critical component of a moving asset. The degradation rate and the consequences of possible actions depend on the system state, dictated by where the moving asset physically is, e.g., in harbor or in-transit for a maritime application.

- **065-1587** Integrated Capacity Planning for Engineers and Spare Parts in Maintenance Logistics  
  Ahmad Al Hanbali, Associate Professor, Twente University Hengelo, Netherlands  
  Andrei Sleptchenko, Assistant Professor, Qatar university, Qatar  
  Henk Zijm, Professor, University of Twente, Netherlands
We analyze integrated tactical capacity planning for spare parts supply and workforce allocation in advanced equipment maintenance logistics. Equipment time-to-failure, spare parts replenishment time, and equipment repair time are random and independent of each other.

065-1574 Commodity Spot Market Procurement Under Hidden, Markov-Modulated Price Regimes
Christian Mandl, Student, TU München, Germany
Stefan Minner, Professor, TUM School of Management, Germany
Due to external events, commodity spot market prices underlie structural breaks. Motivated by Markov regime-switching price models from financial research, we propose a Bayesian price modeling approach and investigate optimality and monotonicity behavior of the inventory policy in terms of unobservable spot price regimes in a hidden Markov framework.

065-1565 Joint Optimization of the Order-Driven and Forecast-Driven Parts of the Supply Chain
Ton de Kok, Professor, Eindhoven University of Technology, Netherlands
We consider an assemble-to-order supply chain consisting of an OEM and multiple suppliers in which components and modules are added over time to a main assembly. The order-driven, multi-stage assembly process is buffered by safety times, while the forecast-driven supply chain is buffered against demand uncertainty by safety stocks.

065-0871 Strategic Behavior in Batch Service Systems
Olga Bountali, Student, Southern Methodist University, United States
Antonis Economou, Professor, University of Athens, Greece
Strategic decisions of customers in batch-service Markovian queues regarding the joining/balking dilemma induce both positive and negative externalities to other customers, in contrast to single service models. Customer equilibrium behavior is studied under various levels of information and interpretations of the mixture of Follow-The-Crowd and Avoid-The-Crowd phenomena are presented.

065-1392 GI/G/M Queuing Systems with Heavy-Tailed Inter-Arrival Times
Yujiao Sun, Student, Dalian University of Technology, China
Ping Wang, Assistant Professor, Texas A&M - Galveston, United States
Xiangpei Hu, Professor, Dalian University of Technology, China
Recent research in queuing focuses more on the impacts of heavy-tailed service times, neglecting the fact that stochastic inter-arrival times are also often heavy-tailed. We investigate the impacts of heavy-tailed exponential or gamma inter-arrival-time distributions on the waiting-time distribution of a GI/G/m queuing system, and provide asymptotic boundaries for the waiting-time distribution.

065-0853 Optimal Firm's Policy under Lead Time- and Price-Dependent Demand: Interest of Customers Rejection Policy
Abduh Albana, Student, Université Grenoble Alpes, France
Yannick Frein, Professor, Université Grenoble Alpes, France
Ramzi Hammami, Professor, ESC Rennes School of Business, France
Considering a lead-time- and price-sensitive demand, we investigate whether a client rejection policy, modeled as M/M/1/K system, can be more profitable than an all-client acceptance policy, modeled as M/M/1 system. We provide analytical insights for the cases with and without holding and penalty costs by comparing M/M/1/1 to M/M/1 models.

065-0023 Revenue Maximization with Optimal Stopping for a Transport Service System
Belleh Fontem, Assistant Professor, University of Mary Washington, United States
We use optimal stopping theory to study a firm seeking to maximize the expected revenue that it derives from a fleet of transport vehicles serving a heterogeneous pool of rental and retail customers. We characterize the optimal stopping strategy and use a numerical example to graphically illustrate its stopping region.

065-2036 Panel Discussion - Pursuing Actionable Research as a Participant-Observer
George Ball, Assistant Professor, Indiana University Bloomington, United States
Rachna Shah, Associate Professor, University of Minnesota, United States
Ann Ferriter, .
Aleda Roth, Professor, Clemson University, United States
Mark Rutkiewicz, .
In this session, a panel of experts will discuss benefits and risks of conducting managerially relevant research in collaboration with industry participants and regulatory agencies. The panel will point to best practices from their individual experiences which could be helpful for future researchers.

065-1608 Diet Problem Revisited
Fariborz Partovi, Professor, Drexel University, United States
It has been close to seventy years since the Diet problem was introduced by Stigler (Stigler 1945). However, the problem with the classical Diet models is based on lack of proper presentation of food preferences. In this article we modify Diet problem using extensions of linear programming.
Will Habit Make Satisfaction a Smaller Issue? Evidence from Using Online Travel Agency Sites

Li Ding, Assistant Professor, Durham University, United Kingdom

Our research unlocks the underlying behavior mechanism of using OTA services, which varies from mainstream E-business models. We develop a model consistent with former studies of website quality, perceived usefulness, satisfaction and habit in prediction of behavior intention of using OTA sites.

Can I Pay to Promote Your Product? Positive/Negative Aspects of Word of Mouth Marketing on Customer Loyalty

Tonny Rodrigues, Associate Professor, COPPEAD Graduate Business School / Federal University of Rio de Janeiro, Brazil
Jaime Silva, Student, Faculdade Santo Agostinho, Brazil
Keully Carvalho, Student, Faculdade Santo Agostinho, Brazil
Átila Lira, Associate Professor, Universidade Paulista - Unip, Brazil
Francisco Freires, Associate Professor, Universidade Federal da Bahia, Brazil

This study aimed to analyze the influence caused by word of mouth marketing (WOM) conducted by customers on the loyalty of other consumers of a steel enterprise. The managerial contribution of this work suggests that corporations develop different strategies to stimulate positive behavior WOM regarding their products and services.
<table>
<thead>
<tr>
<th>Session: Humanitarian Aid and Public Health</th>
<th>Track: Humanitarian Operations and Crisis Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>065-0671</strong> Beneficiaries' Choice in Disaster Relief Logistics</td>
<td></td>
</tr>
<tr>
<td>Christian Burkart, Student, Vienna Univ of Econ &amp; Business Admin, Austria</td>
<td>Pamela Nolz, Scientist, AIT Austrian Institute of Technology, Mobility Department - Dynamic Transp. Sys., Austria</td>
</tr>
<tr>
<td>Walter Gutjahr, Professor, University of Vienna, Department of Statistics and Operations Research, Austria</td>
<td></td>
</tr>
<tr>
<td>A location-routing model for disaster relief anticipates beneficiaries' choices of distribution centers (DCs), minimizing unserved demand (lost and unfulfilled demand) and cost for routing and DCs. We test an exact and a heuristic method for determining the Pareto front.</td>
<td></td>
</tr>
<tr>
<td><strong>065-1135</strong> The Impact of Recent Demand Trends on Blood Bank Operations</td>
<td></td>
</tr>
<tr>
<td>Amir Masoumi, Assistant Professor, Manhattan College, United States</td>
<td></td>
</tr>
<tr>
<td>Dynamics of blood supply chain management across the US have drastically changed over the past few years due to a remarkable demand reduction. We investigate the root causes of this new trend, and examine its impact on blood services with a focus on the operations during the time of disasters.</td>
<td></td>
</tr>
<tr>
<td><strong>065-0663</strong> Outsourcing Humanitarian Logistics Activities to Commercial Logistics Providers</td>
<td></td>
</tr>
<tr>
<td>Ioanna Falagara Sigala, Student, Vienna Univ of Econ &amp; Business Admin, Austria</td>
<td>Tina Wakolbinger, Professor, Vienna Univ of Econ &amp; Business Admin, Austria</td>
</tr>
<tr>
<td>We explore the partnerships between humanitarian organizations and commercial logistics providers. We interview both private companies and HOs and integrate both transaction cost theory (TCT) and resource-based view theory (RBV) to suggest propositions leading to the construction of a framework for outsourcing for the humanitarian sector.</td>
<td></td>
</tr>
<tr>
<td><strong>065-0406</strong> Supply Chain Disintegration as a Strategic Choice: A Theoretical Approach</td>
<td></td>
</tr>
<tr>
<td>Lumibdi Kupanth, Professor, Wakayama University, Japan</td>
<td></td>
</tr>
<tr>
<td>The contention is that the integrated supply chain (ISC) of Japanese electronics companies is no longer a source of competitiveness, it is a heavy liability and a negative inertia pulling them down. We want to show the necessity of strategically destroying ISCs and to switch to disintegrated supply chains (DSC).</td>
<td></td>
</tr>
<tr>
<td><strong>065-1118</strong> Comparing Healthcare Outcome of Rural and Urban Hospitals in Southwestern Nigeria</td>
<td></td>
</tr>
<tr>
<td>Alabi Soneye, Associate Professor, University of Lagos, Nigeria</td>
<td>Pia Polsa, Professor, Hanken School of Economics, Finland</td>
</tr>
<tr>
<td>Imoh Antai, Assistant Professor, Jonkoping University, Sweden</td>
<td></td>
</tr>
<tr>
<td>We examine patients' perceived quality, outcomes and satisfaction with healthcare services, atmosphere, service use, clinical effectiveness and value for money in the rural and urban hospitals in Nigeria comparatively. Our results show a statistically significant relationship between the dimensions evaluated</td>
<td></td>
</tr>
<tr>
<td><strong>065-0760</strong> Central Ordering When Information Is Locally Available: Can Inventory Commitments Coordinate the System?</td>
<td></td>
</tr>
<tr>
<td>Eirini Spiliotopoulou, Assistant Professor, Vrije Universiteit Amsterdam, Netherlands</td>
<td>Karen Donohue, Associate Professor, University of Minnesota, United States</td>
</tr>
<tr>
<td>Mustafa Cagri Gurbuz, Professor, Zaragoza Logistics Center, Spain</td>
<td>H. Sebastian Heese, Professor, Ebs Business School, Germany</td>
</tr>
<tr>
<td>Structural changes in process industries put their profitability at risk. Supply chain management was identified as an essential lever for creating a competitive edge, but SCM research in these industries is scarce and their inventory follows different dynamics. We empirically explore how seven industry characteristics drive inventory.</td>
<td></td>
</tr>
<tr>
<td><strong>065-0170</strong> Social Quality Management and Supply Chain Performance: The Mediating Role of Process and Product Innovation</td>
<td></td>
</tr>
<tr>
<td>Dara Schniederjans, Assistant Professor, University of Rhode Island, United States</td>
<td></td>
</tr>
<tr>
<td>There is a new need for organizations to identify how process product innovations impact supply chain performance. We provide survey data which accounts for not only the positive supply chain implications of product and process innovations but also identifies a core tool for increasing a firm’s product and process innovation.</td>
<td></td>
</tr>
<tr>
<td><strong>065-0182</strong> Inventory Dynamics in Process Industries: An Empirical Investigation</td>
<td></td>
</tr>
<tr>
<td>Philipp Moser, Student, Epfl, Switzerland</td>
<td>Olov Isaksson, Assistant Professor, Stockholm Business School, Sweden</td>
</tr>
<tr>
<td>Ralf Seifert, Professor, Epfl, Switzerland</td>
<td></td>
</tr>
<tr>
<td>Structural changes in process industries put their profitability at risk. Supply chain management was identified as an essential lever for creating a competitive edge, but SCM research in these industries is scarce and their inventory follows different dynamics. We empirically explore how seven industry characteristics drive inventory.</td>
<td></td>
</tr>
<tr>
<td><strong>065-0496</strong> Supply Chain Integration and Dynamics</td>
<td></td>
</tr>
<tr>
<td>Eirini Spiliotopoulou, Assistant Professor, Vrije Universiteit Amsterdam, Netherlands</td>
<td>Karen Donohue, Associate Professor, University of Minnesota, United States</td>
</tr>
<tr>
<td>Mustafa Cagri Gurbuz, Professor, Zaragoza Logistics Center, Spain</td>
<td>H. Sebastian Heese, Professor, Ebs Business School, Germany</td>
</tr>
</tbody>
</table>

**Sunday, 04:15 PM - 05:45 PM**

**Session: Supply Chain Integration and Dynamics**

**Chair(s):** Eirini Spiliotopoulou

**065-0170** Social Quality Management and Supply Chain Performance: The Mediating Role of Process and Product Innovation

Dara Schniederjans, Assistant Professor, University of Rhode Island, United States

There is a new need for organizations to identify how process product innovations impact supply chain performance. We provide survey data which accounts for not only the positive supply chain implications of product and process innovations but also identifies a core tool for increasing a firm’s product and process innovation.

**065-0496** Supply Chain Integration as a Strategic Choice: A Theoretical Approach

Lumibdi Kupanth, Professor, Wakayama University, Japan

The contention is that the integrated supply chain (ISC) of Japanese electronics companies is no longer a source of competitiveness, it is a heavy liability and a negative inertia pulling them down. We want to show the necessity of strategically destroying ISCs and to switch to disintegrated supply chains (DSC).

**065-1988** Inventory Dynamics in Process Industries: An Empirical Investigation

Philipp Moser, Student, Epfl, Switzerland

Olov Isaksson, Assistant Professor, Stockholm Business School, Sweden

Ralf Seifert, Professor, Epfl, Switzerland

Structural changes in process industries put their profitability at risk. Supply chain management was identified as an essential lever for creating a competitive edge, but SCM research in these industries is scarce and their inventory follows different dynamics. We empirically explore how seven industry characteristics drive inventory.
A firm operates in two markets and holds inventory centrally. More accurate demand information is locally available. We study (a) the impact of decision rights placement (locally/centrally) on inventory levels, (b) whether commitments and a pricing mechanism may align incentives so that, under central decision making, credible forecast sharing is an equilibrium.

Sunday, 04:15 PM - 05:45 PM

436  Sunday, 04:15 PM - 05:45 PM, Salon 6
Session: Studies of Hospital Quality of Care
Chair(s): Lawrence Fredendall
Track: Healthcare Operations Management

065-0301 A Multi-Year SEM Model Predicting the Impact of Behavior Attributes on Overall Patient Satisfaction
Dana Johnson, Professor, Michigan Technological University, United States
Roberta Russell, Professor, Virginia Polytechnic Institute And State University, United States
Quinton Nottingham, Associate Professor, Virginia Polytechnic Institute And State University, United States

Prior research was extended to model patient perceptions of behavioral dimensions of service quality and their impact on patient satisfaction in a rural healthcare organization. We applied SEM for three years of data and each individual year. Results suggest improved patient satisfaction and statistically-significant differences existed between years.

065-0859 Investigation of Quality Practices in Health Care Organizations
Xianghui Peng, Student, University of North Texas, United States
Victor Prybutok, Professor, University of North Texas, United States

We test the Baldrige model in healthcare using pre-2000 survey data collected in a large, well-respected hospital in the southwest region of the United States. A subsequent pilot study was conducted using recent data with the intention of collecting a larger data set to conduct a longitudinal study.

065-0953 Reducing Patient Wait in the Emergency Department with New Patient Flow Models
Duane Steward, Research Assistant Professor, Texas A&M – Health Science Center, United States
Todd Glass, Division Chief, Emergency Medicine, Nemours Children’s Hospital, United States
Yann Ferrand, , Clemson University, United States

Before opening a newly constructed emergency department, a discrete event simulation model was employed to validate novel patient flow concepts envisioned. This approach was uniquely applied to enable a specific operations strategy with a naive facility and staff, contributing to significantly lower average length of stay than comparable facilities.

065-1320 An Empirical Assessment of the Determinants of Quality Results in the Healthcare Industry Using Baldrige Data
Mahour Parast, Assistant Professor, North Carolina A&T State University, United States

We investigate the determinants of quality results in the healthcare industry using Baldrige data. We use publicly available data on quality assessment of healthcare organizations that applied for the Baldrige award between 1999-2006.

437  Sunday, 04:15 PM - 05:45 PM, Salon 7
Session: Ambulance Location and Routing
Chair(s): Shirishkumar Gedam
Track: Healthcare Operations Management

065-0736 The Ambulance Relocation and Dispatching Problem
Valérie Bélanger, Student, Cirrelt, Canada
Ettore Lanzarone, Researcher, CNR-IMATI, Italy
Angel Ruiz, Professor, Universite Laval, Canada
Patrick Soriano, Professor, Hec Montreal, Canada

We address the Ambulance Relocation and Dispatching Problem. This problem simultaneously seeks the location of available ambulances and a dispatching policy that minimize both the expected response time and relocation efforts. To solve real-life instances, a solution approach is developed exploiting the division of the territory into sub-regions.

065-1507 Two-Stage Stochastic Programming Model for Designing EMS Service Districts with Ambulance Workload Consideration
Shakiba Enayati, Student, North Carolina State University, United States
Osman Ozaltin, Assistant Professor, North Carolina State University, United States
Maria Mayorga, Associate Professor, North Carolina State University, United States

Quick response to an emergency call could save a life. We propose an offline method to design contiguous and compact districts in an EMS service area to maximize the expected coverage. We also assign ambulances to stations in the district such that the workload per ambulance is within desired bounds.

Shirishkumar Gedam, Professor, Indian Institute of Technology Bombay, India

Providing emergency and medical referral services in rural areas is a challenge in terms of optimal utilization with minimal response time. We propose an integrated solution using GIS, GPS, and mobile communication systems to manage a fleet of 3,500 ambulances spread across the state of Maharashtra in India.

438  Sunday, 04:15 PM - 05:45 PM, Salon 8
Session: Health Care Clinicians: Scheduling and Interactions
Chair(s): Reena Yoogalingam
Track: Healthcare Operations Management

065-1529 Care to Share: Impact of General Practitioner-Specialist Collaborative Structures on Health Care Outcomes
Agnes Lubloy, Associate Professor, Corvinus University of Budapest, Hungary
Keresztszuri Judit, Assistant Professor, Corvinus University of Budapest, Hungary
Benedek Gabor, Assistant Professor, Thesys SEA Pte, Singapore
Gyula Vastag, Professor, National University of Public Service, Hungary
Professional interactions among health providers are critical to an efficient shared-care model. We investigate whether the collaborative structure between general practitioners and specialists affects patients health status or pharmacy costs. We find that a concentrated collaborative structure results in lower pharmacy costs.

**065-1253** Reserving Open-Access Times in Primary Care  
Brigite Werners, Matthias Schacht, Laras Wiesche, Germany
We present an experimental study of a stylized competitive dynamic pricing model for a duopoly. Our results show that our laboratory participant tends to underprice her units at the beginning of a selling season, and as the selling deadline gets closer she tends to overprice her units.

**065-0691** Model for Manpower Planning at an Emergency Department in a Public Medical University Hospital in India  
Venkataramanaiah Saddikuti, Ajaip Singh, India
We present a decision framework that can help healthcare planners and policy makers in crafting a strategy for capacity building in growing demand for emergency care in emerging economies. We propose an LP model and demonstrate it with a real-life case study at a medical university hospital.

**065-1854** A Simulation Optimization Approach for Surgery Scheduling  
Yao Xiao, Reena Yoogalingam, Canada
We use empirical data on surgery durations to model an operating room scheduling problem. A simulation optimization approach is used to identify efficient scheduling policies in terms of resource utilization for elective surgical procedures, given variability in surgery durations and emergency procedures.

---

**065-0561** Competitive Dynamic Pricing under Capacity Constraints: An Experimental Study  
Bahriye Cesarret, Elena Katok, United States
We present an experimental study of a stylized competitive dynamic pricing model for a duopoly. Our results show that our laboratory participant tends to underprice her units at the beginning of a selling season, and as the selling deadline gets closer she tends to overprice her units.

**065-0362** A Behavioral Investigation of the Competitive Newsvendor Problem  
Yinghao Zhang, Tianjun Feng, China
We experimentally investigate ordering behavior in the competitive newsvendor problem. We test many behavioral theories that were proposed to explain a single newsvendor’s decision. We find that only the experience-weighted attraction (EWA) framework can predict human behavior in the competitive setting. This result is further supported using structural model estimation.

**065-1378** Newsvendor Decision with Multiple Benchmarks  
Ying Wei, Feng Li, China
This paper studies how bottom line and status quo as benchmarks influence the news vendor behavior and the optimal order quantity, based on which psychological values of the profit are regarded as gain, loss, or failure. Optimal ordering decision is analyzed and compared to classic news vendor and loss aversion news vendor decisions.

**065-1765** The Behavioral Traps of Making Multiple, Simultaneous, Newsvendor Decisions: An Experimental Study  
Shan Li, Kay yut Chen, United States
We conducted an experimental study to explore behaviors of newsvendors who make order decisions for two stores simultaneously. While the two stores are independent, we find that order decisions are impacted not only by the history from the same store, but also by the past information from the other store.

**065-0635** Consecutive Zero-Sales and Retail Shelf Audits  
Howard Hao-Chun Chuang, Rogelio Oliva, United States
We propose a method to tackle the prevalent shelf out-of-stock in retailing. Using consecutive zero sales as a signal, we develop a cost-balancing policy for shelf audit decisions. We also relax the restrictive IID discrete demand assumption by incorporating integer-valued autoregressive processes into policy design. The proposed policy is point-of-sale data-driven and easily implemented.

**065-0292** Competitive Pricing with Stockouts and Satisfying Customers  
Metin Cakanyildirim, Varun Gupta, United States
Stockouts for high inventory turnover products lead to loss of sales as customers may substitute their preferred product (stocked out) with another product (available). We study single period equilibrium prices for competing retailers selling to satisficing customers with stockout-based substitution under lost sales and backorders.
A Unified Model and Valid Inequalities for Unpaired Pickup and Delivery Vehicle Routing Problem
Kunpeng Li, Associate Professor, Huazhong University of Science & Technology, China
Dongyang Xu, Student, Huazhong University of Science & Technology, China

We investigate the pricing problem of a shopping center faces when using two different mechanisms (sequential and auction procedure) to price and allocate shelf space among an anchor store with identify-dependent externalities and a non-anchor store. We compare these two mechanisms and derive the developer's optimal allocation mechanism.

The Retail Shelf Space Problem: An Analytics Approach
Ramakrishna Govindu, Lecturer, University of South Florida, United States
Anurag Agarwal, Professor, University of South Florida, United States
James Curran, Associate Professor, University of South Florida, United States

Analytics is playing an increasing role in retail decisions. Technology now allows retailers to collect terabytes of data, and although data is increasing, shelf space is still limited. In this paper, we propose an analytics approach for optimizing the retail shelf space problem.

Achieving Operational Efficiency through Workforce Scheduling: A Working Time Account in Retail Stores
Peeyush Pandey, Student, Indian Institute of Management Indore, India
Hasmukh Gajjar, Associate Professor, Indian Institute of Management Indore, India
Bhavin Shah, Associate Professor, Indian Institute of Management Indore, India

We optimize a retailer's workforce and worker schedule by attempting to meet the schedule requirements of workers in each period of the planning horizon. Our model considers preferences in shift length, working time account, and different lunch and tea breaks during the working shift.

Investigating Knowledge-Based Enablers of Supply Chain Adaptability: A Comparison between China and United States
Zhiqiang Wang, , South China University of Technology, China
Xiande Zhao, , School of Business Administration, South China University of Technology, China
Shanshan Zhang, Mr., South China University of Technology, China
Tobias Schoenherr, , Michigan State University, United States
Morgan Swink, , Texas Christian University, United States

We attempt to investigate the relationship among intellectual capital, supply chain learning, and supply chain adaptability. A research model is tested by using a dataset of 300 Chinese manufacturers and 231 U.S. manufacturers in high-tech industries. Our study provides empirical evidences on the roles of IC in the SCM.

The Speeds of Adjustment of Inventory and Market Performance
Shih-Sian Jhang, Student, University of Buffalo, United States
Winston Lin, Professor, SUNY At Buffalo, United States

Our paper is devoted to the speeds of partial adjustment of actual inventory toward expected inventory in US manufacturing firms based on the partial adjustment theory. We also link the speeds of partial adjustment to the concept of manufacturing flexibility and market performance.

Using Agile in Construction Projects: It’s More Than a Methodology
Milind Padalkar, Student, Indian Institute of Management Kozhikode, India
Saji Gopinath, Professor, Indian Institute of Management Kozhikode, India
Abhilash Kumar, Chief Executive, ULCCS Ltd., India

Agile methods have been successful in information technology projects. Can they lead to superior performance in construction projects facing high uncertainty? From case study of a high performance construction cooperative, we find that agile methods succeed when supplemented by high levels of trust, vertical communication, and effective client relations.

Model and Algorithm for the Simultaneous Pickup and Delivery Vehicle Routing Problem With Split Loads
Kunpeng Li, Associate Professor, Huazhong University of Science & Technology, China
Hanmei Li, Student, Huazhong University of Science & Technology, China

This paper establishes a cost minimization model for a large scale vehicle routing problem with simultaneous pickup and delivery. An initial feasible solution is obtained via a heuristic transportation efficiency based algorithm and then improved by a local search algorithm based on a variable neighborhood search.

A Unified Model and Valid Inequalities for Unpaired Pickup and Delivery Vehicle Routing Problem
Dongyang Xu, Student, Huazhong University of Science & Technology, China
Kunpeng Li, Professor, Huazhong University of Science & Technology, China
We address multi-commodity unpaired pickup and delivery vehicle routing problem. This problem contains two correlated decisions: supply-demand pairing and vehicle routing. We develop a novel unified formulation, which removes the coupled decisions relationship. Additionally, we propose some properties and valid inequalities. Computation results show that the above studies are valuable.

**065-1478** Time Window Discretization Method For A Dynamic Truckload Pickup And Delivery Problem

Hossein Zolfagharinia, Assistant Professor, Ryerson University, Canada

Michael Haughton, Professor, Wilfrid Laurier University, Canada

Inspired by a real-life operating carrier, this study addresses a dynamic pickup and delivery problem with full truckload for local operators. Our main purpose is to develop a computationally efficient algorithm for solving a special case of this problem.

**065-0177** An Approach for the Chance Constrained Inventory Routing Problem

Lijian Chen, Assistant Professor, University of Dayton, United States

Wen-Chyuan Chiang, Professor, The University of Tulsa, United States

Robert Russell, Professor, University of Tulsa, United States

We solve an inventory routing problem in which the service level is concerned. We propose a numerical approach to solve the problem in two phases. In the first phase we determine the amount to deliver and in the second phase we derive the route.

**065-1842** Map Segmentation for Geographic Price Discrimination Problems

Mehdi Behroozi, Student, University of Southern California, United States

John Carlsson, Assistant Professor, University of Southern California, United States

Zizhuo Wang, Assistant Professor, University of Minnesota, United States

We use map segmentation techniques and convex optimization tools to develop a new approach for geographic price discrimination problems. We present an efficient algorithm to find the optimal partition of a geographic region into a set of sub-regions, as well as the optimal price in each sub-region.

**065-0535** Dynamic Pricing with a Fare-Lock Option

Ming Chen, Assistant Professor, California State University Long Beach, United States

Zhi-Long Chen, Professor, University of Maryland, United States

We study a dynamic pricing problem frequently seen in the airline industry where customers are offered an option to lock a fare at a small fee for a certain time period. We build a dynamic pricing model to investigate the implications of this type of practice.

**065-0175** Spreadsheet Pricing Could Be Optimal For the Time-Varying Revenue Management

Lijian Chen, Assistant Professor, University of Dayton, United States

Shanling Li, Professor, McGill University, Canada

Derek Wang, Assistant Professor, McGill University, Canada

We discuss the reasoning behind a spreadsheet based pricing practice for time-varying revenue management. Such a problem can be modeled as a stochastic dynamic control problem. We show that the spreadsheet solution is essentially an affine controller which optimizes the objective under mild settings.

**065-1789** Dynamic Pricing in a Trade-In Program with Replacement and New Customers

Yongbo Xiao, Associate Professor, Tsinghua University, China

We consider a manufacturer who produces and sells a new generation of products to two groups of customers: replacement and new segments. We present a dynamic trade-in program, in which any replacement customer can return the old product in exchange for a price discount when buying a new product.

**065-0273** Brazilian’s public policies that nurture emerging solutions for sustainable operations

Washington Luiz Soares, Student, UNISANTOS, Brazil

Eliane Maria Martins, Professor, UNISANTOS, Brazil

Getulio Akabane, Retired, Faculdade Anhembi Morumbi, Brazil

Hamilton Pozo, Retired, Anhembi Morumbi, Brazil

The Environmental Control Management Study proposes the construction of new railways to connect Brazilian ports and improve air quality through increased fuel efficiency. However, since air quality is not regulated public and private sectors do not share responsibility for protecting the environment.

**065-0867** Pricing and Carbon Emission Reduction in a Two-Echelon Supply Chain

Mingzheng Wang, Professor, Dalian University of Technology, China

Zizhuo Wang, Student, Dalian University of Technology, China

We investigate pricing and carbon emission reduction decisions for a two-echelon supply chain with a cap-and-trade scheme. Three channel structures are considered: single retail, single online, and dual channel.

**065-0910** Carbon Pooling Dynamics Between a Manufacturer and a Retailer

Dincer Konur, , Missouri University of Science And Technology, United States

This paper studies the dynamics on how a manufacturer and a retailer can pool their carbon emission caps. In particular, we analyze non-cooperative and cooperative carbon pooling games, determine their solutions, and compare their economic and environmental implications.

**065-1278** A Review of the Literature on Corporate Social Responsibility (CSR): Strategies of Multinational Corporations
Corporate social responsibility is an important international business issue strongly related to the strategy of multinational corporations. We review literature related to CSR and corporate strategy found in the Scopus and Web of Science databases and propose future directions.

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Energy and Natural Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy and Natural Resources Management in Developing Countries</td>
<td>447</td>
</tr>
<tr>
<td>Chair(s):</td>
<td>Otavio Figueiredo Aline Avelar</td>
</tr>
<tr>
<td>065-1107</td>
<td>Rural Livelihood and Commodity Value Chains in Nigeria: A Study of Charcoal Production and Consumption</td>
</tr>
<tr>
<td>Alabi Soneye, Associate Professor, University of Lagos, Nigeria</td>
<td>In the Nigerian context, we examine the role of charcoal production and consumption within the rural livelihoods. The study reveals the complexities of charcoal value chains, including the roles of producers, distributors, and retailers.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Information in Operations Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of IT in Smart Operations</td>
<td>448</td>
</tr>
<tr>
<td>Chair(s):</td>
<td>Elmar Hartweg</td>
</tr>
<tr>
<td>065-0530</td>
<td>A Design Scheme of Information System for Public Housing Allocating</td>
</tr>
<tr>
<td>Xiao Liu, Student, Huazhong University of Science &amp; Technology, China</td>
<td>This paper presents a design scheme for an information system aimed at optimizing public housing allocation processes. The scheme is case-study based and is shown to be able to significantly reduce the complexity of the allocation process.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Information in Operations Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Management in Energy Trading</td>
<td>449</td>
</tr>
<tr>
<td>Chair(s):</td>
<td>Derck Koolen</td>
</tr>
<tr>
<td>065-1713</td>
<td>The Role of Information Transparency on Decision Making in Electricity Wholesale Markets</td>
</tr>
<tr>
<td>Derck Koolen, Student, Erasmus University Rotterdam, Netherlands</td>
<td>In this study, we explore how information transparency affects decision-making processes in the electricity wholesale market. The findings highlight the importance of transparency in enhancing market efficiency.</td>
</tr>
</tbody>
</table>
We propose a new framework to aggregate and exploit the flexibilities of residential and commercial electricity customers to build a robust, resilient, efficient and reliable power system. We discuss theoretical and practical challenges and opportunities of this cooperative game. Computational performance and solution quality will be examined through simulation.

We analyze how operational factors of production, such as its flexibility and reliability, can influence market prices indirectly through altering the balance of spot and forward trading. As a result, increasing the capacity of intermittent renewable electricity generation, despite its lower marginal cost, may not necessarily reduce prices.

Our study examines the importance of collaboration on firms' innovativeness in the Nigerian mining industry. 83% of the survey firms collaborated for their innovations, while 77.4% of the firms were innovative. The study concluded that collaboration is a key driver for innovation and performance.

High capacity utilization and maximized flexibility of resources are key success factors for industrial companies. Digitalization can support the achievement of these objectives. In particular, dynamic planning approaches stretching across companies unlock substantial cost potentials. We investigate the current state of practice and identify major enablers and barriers in this field.

Under asymmetric cost information and endogenous prices, we study a replenishment model in which a manufacturer sources from a main supplier and an emergent supplier. We compare the manufacturer's decision and each party's profits under the differential pricing strategy and the uniform pricing strategy.

We examine a nomological network that relates contractual, competence, and goodwill trust to supply chain integration (SCI) via affective and continuance commitment in the context of manufacturing firms. Moreover, we examine the moderating role of asset specificity on the relationship between commitment and SCI.

This research aims to meaningfully associate with the practices of low-income consumers in the purchase of customized cars. The results provide information relevant to the process of technological innovation in the production of customized cars, adapting the product to the customer's preferences for affordable prices and design.

Modular product architectures allow companies to offer a wide variety of products while limiting internal complexity. Major challenges in this context are the evaluation of product architecture alternatives and their consequences for a company-wide implementation. We show how theoretical concepts can be linked to company practice.

We evaluate and implement modular product architectures while focusing on the business and technical aspects while addressing the major challenges in modular product architecture.
The Kano Model has significantly influenced industry’s understanding of product/service design, customer satisfaction and quality. Nevertheless, most academic and practitioner literature considers only three of Kano’s original five attribute categories. We focus on the oft-forgotten Reverse and Indifferent categories, with case examples, analysis and implications for improving product/service design.

**065-0572** Locating Warehouse in an Emerging Country: A Win-Win Proposition?
Ying Zhang, Student, University of North Carolina Chapel Hill, United States
Jayashankar Swaminathan, Professor, University of North Carolina, United States

We investigate the trend of warehouse outsourcing where a supplier and a retailer negotiate over the wholesale price and batch size conditional on the retailer’s warehouse location, the emerging country or the developed country. We show that the emerging-country warehouse can be beneficial even without cost advantage.

**065-1160** Brazilian Foreign Trade: A Logistics Performance Index Analysis into the Global Environment
Hellen Chagas, Student, CEEETEPS, Brazil
Valmir Moura, Student, CEEETEPS - Centro Estadual de Educação Tecnológica Paula Souza, Brazil
Renata Oliveira, Student, CEEETEPS - Centro Estadual de Educação Tecnológica Paula Souza, Brazil
Neemias Ferreira, Student, CEEETEPS, Brazil
Getulio Akabane, Retired, CEEETEPS - Centro Estadual de Educação Tecnológica Paula Souza, Brazil

We analyze foreign trade logistics performance, identifying the most critical barriers that hinder Brazilian competitiveness, through a literature and specialized documents research. Our results, compared with world class data, show an overview to compare against local and global performance, emphasizing the main points to be improved.

**065-0267** Quantifying the Benefits of Supply Chain Traceability in Oman’s Seafood Industry
Mohammed AlRizeiqi, Student, University College Dublin UCD, Ireland
Paul Walsh, Professor, University College Dublin UCD, Ireland
Vincent Hargaden, Assistant Professor, University College Dublin, Ireland

The seafood industry in Oman accounts for nearly 0.6% of the nation's GDP (€212,515,410 in 2013). A lack of integrated supply chain traceability has resulted in product recalls, waste, and exclusion from lucrative export markets. We demonstrate the economic benefits of traceability in Oman’s seafood supply chain and highlight implementation issues.

**065-0587** The Impact of External Integration on Emergency Services Performance: An Empirical Investigation
Monique French, Associate Professor, University of Colorado Colorado Springs, United States
Ying Fan, Assistant Professor, University of Colorado Colorado Springs, United States
Rebecca Duray, Professor, University of Colorado Colorado Springs, United States

Business decision making in oligopolies is systemically affected. The decision to expand a company will create reactions from distinct stakeholders since it may alter the economic scenario. We create a computer model based on game theory and system dynamics in order to create scenarios that could capture such reactions.
The goal of emergency services is to minimize casualties and property loss. External integration strategies may help them leverage their limited resources to achieve these goals. Applying supply chain research to public services, we study the impact of external integration on performance utilizing a dataset from the U.S. Fire Administration.

**065-0101** Project Portfolio Management in the Public Service: A Literature Review  
Paulo Maceta, Student, Universidade De Sao Paulo, Brazil  
Fernando Berrasneti, Professor, Universidade De Sao Paulo, Brazil  
Marly Carvalho, Professor, Universidade De Sao Paulo, Brazil  

Our study explores the recent use of Project Portfolio Management (PPM) methodologies in the public service. A literature review was conducted to identify the characteristics of public organizations that initiate the adoption of the PPM, the methodologies and practices that have been used, and other relevant aspects of the topic.

**065-0264** Creating a Culture of Order and Cleanliness at Irish Court Services  
Salil Kalghatgi, Alumnus / SAP Contractor, University of Northern Iowa, United States  
Daniel Bumblauskas, Assistant Professor, University of Northern Iowa, United States  

The Irish Court Services (ICS) provides judiciary and legal services to all of the counties in Ireland. Many changes have taken place and ICS has had to respond very rapidly with limited resources. We have applied lean, six-sigma and SS to improve the operations and culture of ICS.

**065-0028** Inventory Management: A Small Enterprise in the Electronics Sector Case Study  
Diego Settemanni, Assistant Professor, Federal University of Santa Catarina, Brazil  
Guilherme Tortorella, Assistant Professor, Federal University of Santa Catarina, Brazil  
Carlos Ernani Fries, Associate Professor, Federal University of Santa Catarina, Brazil  

We develop and implement a proposal to standardize decision-making regarding management of finished goods inventory in a small electronics sector company. Through this inventory management method, we show how to improve the level of service, reducing the lack of finished goods in order fulfillment.

**065-1426** The Store in Company System as a Strategy for Cost and Inventory Reduction and Improving Service Level  
Mauricio Molfino, Student, Universidade Santa Cecilia, Santos, Brazil  
Hellen Chagas, Student, CEETEPS, Brazil  
Renata Oliveira, Student, CEETEPS - Centro Estadual de Educação Tecnológica Paula Souza, Brazil  
Maria Cristina Matos, Professor, Universidade Santa Cecilia, Brazil  
Jair Souza, Student, SENAC - Serviço Nacional de Aprendizagem Comercial - Santos/SP, Brazil  

Our exploratory study, using literature research and qualitative research, shows a way to reduce the stock of a steel company deploying a "Store in Company" system as a way to increase competitiveness. The results show both inventory reduction and cost reduction.

**065-1433** Inventory Replenishment Decision Support  
Matthew Dean, Associate Professor, University of Southern Maine, United States  

We describe an MBA-led project to help a local glass and metal fabricator improve its inventory replenishment system. Historically, the firm relied on a manual inventory system controlled by a single person with many years of experience. The MBA team developed a spreadsheet-based linear programming model to recommend purchasing decisions.

**065-0822** Inventory Management Policy in a University Pharmacy  
Azucena Garcia-Leon, Professor, Universidad Autonoma De Nuevo Leon, Mexico  
Elva Puente-Aguilar, Professor, Universidad Autonoma De Nuevo Leon, Mexico  
Arletith Aguilar-Villarreal, Professor, Universidad Autonoma De Nuevo Leon, Mexico  
Patricia Gómez-Fuentes, Professor, Universidad Autonoma De Nuevo Leon, Mexico  
Argelia Vargas-Moreno, Professor, Universidad Autonoma De Nuevo Leon, Mexico  

Our research analyzes the operation, management, and inventory control of a university pharmacy, developing an inventory policy for medication and establishing procedures and recommendations for the process. These improvements led to enhanced use of resources in order to provide higher-quality service to the community.

**065-1767** Development of New Methods of Inventory Management in a Refrigeration Company  
Tonny Rodrigues, Associate Professor, COPPEAD Graduate Business School / Federal University of Rio de Janeiro, Brazil  
Sinara Farias, Student, Faculdade Santo Agostinho, Brazil  
Jaime Silva, Student, Faculdade Santo Agostinho, Brazil  
Cícero Duarte, Assistant Professor, Universidade Paulista - Unip, Brazil  

Our research aims to introduce new inventory management methods in a refrigeration company. The results point to a better inventory management which makes an association between: (a) ABC curve; (b) classification and codification of the stock by groups and sub-groups of products; (c) development of a new plant for inventory.

**065-0198** Exploring Supplier Responses under Different Relationship Governance Mechanisms  
Hung-Chung Su, Assistant Professor, University of Michigan Dearborn, United States  
Yi-Su Chen, Assistant Professor, University of Michigan Dearborn, United States  

The goal of emergency services is to minimize casualties and property loss. External integration strategies may help them leverage their limited resources to achieve these goals. Applying supply chain research to public services, we study the impact of external integration on performance utilizing a dataset from the U.S. Fire Administration.
Existing buyer-supplier relationship literature has studied opportunism in an impending supply disruption context from a buyer’s perspective. In this study, we compare what would a supplier expect OEM to do versus what a supplier would do to its OEM. Results of this comparison provide new insights for both sides of a dyad.

**065-00124** Enhanced Commodity Forward Buying  
Andrew Manikas, Assistant Professor, University of Louisville, United States  
James Kroes, Assistant Professor, Boise State University, United States

We present a method for commodity purchasing, which allows strategic forward buying of commodities for products that include commodity components. Our method addresses limitations of existing methods by considering stochastic demand and stochastic commodity prices for products that contain both commodity and non-commodity materials.

**065-0327** Supplier Selection and Competition  
Arman Basu, Prof, Indian Institute of Management Bangalore, India  
Taran Jain, Indian Institute of Management Bangalore, India  
Jishnu Hazra, Professor, Indian Institute of Management Bangalore, India

We study a buyer’s sourcing strategy when facing suppliers who reduce their unit costs through investments in process improvements. The buyer sources his requirement from these suppliers over two periods through a combination of guaranteed amount and bidding competition. We characterize the buyer’s optimal procurement policy and suppliers’ investments.

**065-0031** Supplier Relationship Management: Relationship between Practices and Performance in the Industrial Auto Parts Industry  
Wilson Hilsdorf, Assistant Professor, Centro Universitario Da Fei, Brazil  
Carlos Romano, Student, Centro Universitario Da Fei, Brazil

Supplier Relationship Management is a current subject of interest for many companies trying to achieve key organizational objectives. We examine whether the use of SRM practices influences the performance of industrial auto parts companies in Brazil, providing information for the definition of supplier strategy.

**065-0315** Supplier Selection and Competition  
Lucila Campos, Associate Professor, Federal University of Santa Catarina, Brazil  
Diego Vazquez-Brust, Professor, Royal Holloway, University of London, United Kingdom

We discuss the synergy and implementation of lean and green practices in the appliance industry (white goods). We select integrated lean and green practices from literature and discuss whether or not they are synergic through an in-depth case study.

**065-0506** The Role of Supply Networks in Diffusion of Sustainable Practices  
Anirban Adhikary, Indian Institute of Management Bangalore, India  
Krishna Sundar Diathia, Professor, Indian Institute of Management Bangalore, India  
Jayanth Jayaram, Professor, University of South Carolina, United States

We explore the role of supply network structure and relationships with suppliers in diffusing sustainable practices across the entire supply network. Using the lens of social network theory, we argue that diffusion enablers will affect supply network structure and, subsequently, the diffusion of sustainable practices.

**065-0469** An Overview of Green Supply Chain Management Practices in Bangladeshi Construction Industries  
Mohammed Chowdhury, Student, LSC - Cardiff Metropolitan University, United Kingdom  
Arvind Upadhyay, Senior Lecturer, University of Brighton, UK, United Kingdom  
Briggs Austin, Senior Lecturer, LSC-CARDIFF Metropolitan University, United Kingdom  
Md Mostain Belal, Student, LSC - Cardiff Metropolitan University, United Kingdom

The construction industry is becoming increasingly aware of contemporary trends in Green Supply Chain Management (GSCM). These trends are working as a catalyst, helping firms gain competitive advantage and sustainable growth through environmental consciousness and globalization. We present a literature review of GSCM practices in the construction industry of Bangladesh.
<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Environmental Operations Management</th>
<th>Chair(s): Tolga Aydinliyim</th>
</tr>
</thead>
</table>
| 065-0905 | Collaboration Between Competitors and Its Effect on Green Product Development | Maryam Hafezi, Assistant Professor, Laurentian University, Canada  
Xuan Zhao, Wilfrid Laurier University, Canada |
| 065-1145 | Supply Chains with Excessive Scrap: Incentivizing Input Reduction vs. Enhancing Recycling Capabilities | Tolga Aydinliyim, Assistant Professor, Baruch College, United States  
Eren Cil, Assistant Professor, University of Oregon, United States  
Nagesh Murthy, Associate Professor, University of Oregon, United States |
| 065-1782 | Operational Analysis of a Petrochemical Refinery Complex | Youyi Feng, Professor, Zaragoza Logistics Center, Spain  
Guoming Lai, University of Texas Austin, United States  
Wei Yang, Associate Professor, LIU Post, United States |

**Session: Servitization and Manufacturer Service Strategy**  
**Chair(s): Ornella Benedetti**

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Service Operations</th>
</tr>
</thead>
</table>
| 065-1940 | Relationship of the Internal and External Factors of an Organization with the Servitization Orientation | Nikhil Varma, Student, Hec Montreal, Canada  
Claudia Rebollo, Associate Professor, Hec Montreal, Canada  
Julie Paquette, Associate Professor, Hec Montreal, Canada |
| 065-1453 | Servitization and Sustainability: Some Insights about Its Boundaries and Mindsets | Aline Sacchi Horwich, Student, Universidade De Sao Paulo, Brazil  
Marly Carvalho, Professor, Universidade De Sao Paulo, Brazil |
| 065-1862 | Antecedents of Service Strategy Adoption by Manufacturing Firms | Sina Golara, Student, Arizona State University Tempe, United States  
Kevin Dooley, Professor, Arizona State University Tempe, United States |
| 065-1236 | The Contribution of Capabilities to the Service Orientation of Manufacturing Companies | Ornella Benedetti, Assistant Professor, University of Cambridge, United Kingdom  
Andy Neely, Professor, Cambridge University, United Kingdom |

**Session: Retail Applications**  
**Chair(s): Shong-lee Su**

<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Empirical Research in Operations Management</th>
</tr>
</thead>
</table>
| 065-1214 | A Study of the Factors Making an Online Customer Review Helpful on a Professional Forum | Fa Guo, Student, Huazhong University of Science & Technology, China  
Shuqin Cai, Professor, Huazhong University of Science & Technology, China  
Cuiping Li, Student, Huazhong University of Science & Technology, China |
Online video games generate billions of dollars in revenue annually, and there is increased evidence that consumers experience these games socially. We find empirical evidence that social behavior is linked to user engagement overall, but closer relationships with other players may negatively impact retention, particularly for early adopters.
Supply Chain Management Maturity and Concept Dimensions: A Relationship Framework Proposal

We study the links between entrepreneurial profile and their relationship in the supply chain, making a comparative study of a sample of entrepreneurs from Brazil and Ecuador. The results indicate that the management of entrepreneurial trust is one of the main constructs in that relationship.
We conduct a systematic literature review and propose a framework to showing the relationship between Supply Chain Management Maturity and Supply Chain Management Concept. We present a better understanding of SCM maturity dimensions and SCM concept dimensions based on the literature and then show how this framework can also support future field research.

065-1407 Supply Chain Management Maturity: A Case Study on a Biotechnology Organization

Luiz Roque, Logistics Supervisor, Instituto de Biotecnologia Molecular do Paraná, Brazil
Guilherme Frederico, Professor, Federal University of Paraná, Brazil

We present a case study done in a Brazilian biotechnology organization aiming to gather evidence about the maturity of dimensions of its SCM. Considering the crucial importance of SCM in companies linked to the health sector, the results of research show the dimensions which must be improved to allow company achieve higher level of SCM maturity. We examine SCM theory as well as the similar companies that desire to apply the SCM maturity model.

065-1751 Accurate Understanding of the Effect of Entrepreneurial Orientation on Supply Chain Performance

Suman Niranjani, Associate Professor, Savannah State University, United States
Vishal Gupta, Associate Professor, University of Mississippi, United States

We propose introducing refinements to assessing EO effect on supply chain performance, using variance partitioning methodology to unearth aggregate EO impact on supply chain performance. We examine the EO- supply chain performance relationship in sub-samples of high-, medium-, and low-discretion industries using secondary data.

065-0581 Optimal Admission/Discharge Criteria for Patients with Heart Failure

Sanket Bhat, Student, Mcgill University, Canada
Beste Kucukyazici, Assistant Professor, Mcgill University, Canada

Although more than 80% of the patients presented to Emergency Departments with heart failure symptoms are hospitalized, the majority of patients are not in need of an acute intervention beyond decongestion. We develop a stochastic model that assess the risk levels of the patients, and determine criteria for optimal admission/discharge.

065-1058 Online Decision Making with High-Dimensional Covariates

Hamsa Bastani, Student, Stanford University, United States
Mohsen Bayati, Assistant Professor, Stanford University, United States

Big Data has enabled decision-makers to personalize decisions at the individual level. We present an efficient bandit algorithm and corresponding theoretical guarantees for this task under online high-dimensional settings. We apply our algorithm to the clinical problem of warfarin dosing, and demonstrate that it outperforms existing methods as well as physicians.

065-1411 Impact of Within and Between Region Incentives in an HIV Prevention Resource Allocation Process

Monali Malvankar-Mehta, Assistant Professor, University of Western Ontario, Canada
Gregory Zaric, Associate Professor, University of Western Ontario, Canada
Xinghao Yan, Assistant Professor, University of Western Ontario, Canada

Funding for HIV prevention has increased to $19.1 billion as of 2013. Globally, $22 million is required to address the HIV epidemic. With this significant resource gap, timely and efficient allocation decisions are required. We incorporate multiple incentives in an HIV prevention funds allocation process using dynamic programming to encourage efficient decisions.

065-1928 Confirmatory Factor Analysis of Critical Success Factors in Healthcare Information Systems in India

Nizar Hussain M, Associate Professor, TKM College of Engineering, Kollam - 5, India
Suresh Subramoniam, Associate Professor, CET School of Management, College of Engineering, Thiruvananthapuram, India

Based on a conceptual framework for identifying variables critical for the success of Healthcare Information Systems adoption in India, we test a new instrument for reliability and validity. Our research uses Confirmatory Factor Analysis to establish and confirm the fitness of the model using Structural Equation Modeling.

065-0159 Use of RFID Traceability Technologies in Healthcare Operations

Chun-Hung Cheng, Associate Professor, Chinese Univ of Hong Kong, Hong Kong
Dorbin Ng, Project Manager, Chinese Univ of Hong Kong, Hong Kong
Ziya Zhou, Student, Chinese Univ of Hong Kong, Hong Kong

We discuss the use of RFID traceability technologies in a healthcare facility, introducing the adopted RFID hardware and the software platform. We present details from a pilot study of the system.

065-0127 Sustainability Planning for Healthcare Information Exchanges with Supplier Discount Program

Tharanga Rajapakse, Assistant Professor, University of Florida, United States
Chelliah Srikandarajah, Professor, Texas A&M University College Station, United States
Subodha Kumar, Professor, Texas A&M University College Station, United States
Arun Sen, Professor, Texas A&M University College Station, United States

We investigate a two-period two-service model where a Healthcare Information Exchange (HIE) offers information sharing service, and supplier discount program. First, we present structural properties and equilibrium solution. Then, based on extensive computational experiments, we present insights for the HIE providers and the policy-makers.
Monday, 08:00 AM - 09:30 AM

065-0092 Linking IT Adoption, Partner-Interaction, Ease of Use, Perceived Usefulness, and Co-Creation in Hospitals
Samyadip Chakraborty, Assistant Professor, IFHE University, India
David Dobrzykowski, Assistant Professor, Rutgers University, United States

IT adoption and value co-creative practices among network partners are important, but largely unexamined issues in the healthcare sector. We consider the unique operational complexities of hospitals and empirically analyze linkages among IT Adoption, partner interaction, ease of use, perceived usefulness, and co-creation to contribute to theory and practice.

065-0783 Design of Multi-Tiered Formularies
Gilles Reinhardt, Associate Professor, University of Ottawa, Canada

Formulary tiering is a mechanism that can make the supply chain of prescription drugs perform better. We discuss analytic designs for a coordinated and equitable supply chain, both for its upstream segment (manufacturers and insurers, who have conflicting objectives and action sets) and its downstream one (plan-consumer, where we model drug-to-tier allocations).

065-0959 Order Online, Pickup Offline Strategy in a Chinese Pharmaceutical Supply Chain
Ge Yang, Southeast University, Southeast University, China
Lindu Zhao, Southeast University, China

We study a coordination strategy for a dual-channel pharmaceutical supply chain under Chinese GSP regulation, given that community drugstores become pickup sites in the e-commerce channel. We propose a revenue sharing contract from the retailers' perspective, and discuss a situation in which this cooperation is the optimal strategy.

065-2528 Supply and Demand Alignment At Outpatient Clinics
Samira Fazel Anvaryazdi, Student, Wayne State University, United States
Ratna Babu Chinnam, Professor, Wayne State University, United States
Saravan Venkatachalam, Assistant Professor, Wayne State University, United States

We discuss methods for improving flow at outpatient clinics through effective appointment scheduling policies by applying a two-stage stochastic programming approach. The aim is to increase throughput per session while providing timely care, continuity of care, and overall patient satisfaction, as well as equity of resource utilization.

066-1534 A Decision Support System for Appointment System Templates with Operational Performance Targets
William Millhiser, Associate Professor, Baruch College, United States
Emre Veral, Professor, Baruch College, United States

We propose a decision support tool for scheduling multiple patient types in outpatient services. Schedulers are given dynamic assistance in selecting appointment slots using operational metrics that yield managed patient waits and provider overtime. Our results demonstrate successful implementation of theoretical findings in prior research, and extend applications to heterogeneous classes.

066-1667 A Behavioral Experiment on Forecasting Of Supply Chain Disruption
Sourish Sarkar, Assistant Professor, Penn State University Erie, United States
Sanjay Kumar, Associate Professor, Penn State University Erie, United States

We explore the effect of forecasting supply chain disruption using the beer game in a controlled laboratory setting. Considering both upstream and downstream disruptions, we experiment with several scenarios: disruption with forecast, but no information sharing; disruption without forecast, and no information sharing; and disruption without forecast, and information sharing.

066-1619 Supply Chain Contract Design for Post-Harvest Storage Technologies in a Developing Economy
Jaime Castaneda, Lecturer, Universidad Nacional De Colombia, Colombia
Mark Brennan, Student, Massachusetts Institute of Technology, United States
Jarrod Goentzel, Lecturer, Massachusetts Institute of Technology, United States

We study how supply chain contracts can help artisanal manufacturers of improved crop storage technologies in Uganda address potential under-ordering. Results from a non-computerized decision-making experiment with six artisanal manufacturers and 40 undergraduate students in Uganda reveal under-ordering, though customized contracts do help participants improve their performance.

066-1686 Mental Accounting and Payment Schemes in Manufacturer's Returns Policies
Jun Ru, Assistant Professor, Suny At Buffalo, United States
Charles Wang, Associate Professor, Suny At Buffalo, United States

Returns policies have been used between the manufacturer and retailer in supply chains with uncertain demand. This research extends our understanding of returns policies by adopting the concept of mental accounting to describe the manufacturer's behavioral decisions under returns policies.

066-1466 Transshipments in Supply Chains: Beyond the Analytical Models
Sebastian Villa, Student, University of Lugano, Switzerland

This paper experimentally tests whether subjects coordinate through any transshipment strategy in a system composed of one supplier and two symmetric retailers. Results show that retailers deviate from the Nash equilibrium. Different behavioral models describe subjects' decisions. Finally, proper communication and best-response heuristics increase retailers' and supply chain's average profits.
**Session:** Retail Operations Strategy  
**Chair(s):** Ville Sillanpaa

---

**065-0745**  
**Title:** Value of Probabilistic Forecasts of Slow Moving Products in Retail  
**Authors:** Ville Sillanpaa, Student, Aalto University, Finland, Juuso Liesio, Assistant Professor, Aalto University, Finland

Replenishment order simulations provide a robust alternative over time-series models for forecasting a retail distribution center’s orders. We examine the improvement probabilistic consumer demand forecasts provide over deterministic methods in the context of these simulations for slow moving products. Results show that probabilistic forecasts provide significant improvements to forecast accuracy.

---

**065-1398**  
**Title:** Just In Time Retail: A Study on Barriers for Model Implementation in Micro and Small Supermarkets in Santos SP  
**Authors:** Karla Canete, Student, CEETEPS - Centro Estadual de Educação Tecnológica Paula Souza, Brazil, Hamilton Pozo, Retired, CEETEPS - Centro Estadual de Educação Tecnológica Paula Souza, Brazil, Hellen Chagas, Student, CEETEPS, Brazil, Denilson Carvalho, Student, CEETEPS - Centro Estadual de Educação Tecnológica Paula Souza, Brazil, Getulio Akabane, Retired, CEETEPS - Centro Estadual de Educação Tecnológica Paula Souza, Brazil

We assess the barriers micro and small supermarkets in Santos City, São-Paulo face when implementing Just In Time retail. Results based on qualitative (open ended questions) and quantitative (Likert scales) responses indicate that managers are willing to overcome implementation barriers and move towards JIT systems.

---

**065-1640**  
**Title:** Try Before You Buy Pricing: Should Rental Fees Apply To Purchases?  
**Authors:** Monire Jalili, Student, University of Oregon, United States, Michael Pangburn, Associate Professor, University of Oregon, United States

When a product has uncertain value or is used repeatedly, customers may opt to rent the product before making a purchase. Given customers with uncertain valuations, we analyze optimal purchase vs. rental prices and investigate conditions under which the firm should apply some of the rental price toward purchase conversions.

---

**065-1730**  
**Title:** Impact of Customer Acceptance of Online Channel Variation on Firm Profit  
**Authors:** Rofin TM, Student, Indian Institute of Technology Kharagpur, India, Biswajit Mahanty, Professor, Indian Institute of Technology Kharagpur, India

This study considers a dual channel supply chain setting where the online and the traditional retailers are engaged in Cournot competition and collusion. Game theoretic models are built to study the influence of changes in customer acceptance of the online channel on the profit of the supply chain members.

---

**Session:** Firm Performance  
**Chair(s):** Christopher Zobel

---

**065-1162**  
**Title:** Make or Buy? How Does Firm Diversification Affect CEO Succession?  
**Authors:** Juehui Shi, Student, Suny At Buffalo, United States, Jurian de Jong, Assistant Professor, Suny At Buffalo, United States

Recently, there has been a debate on whether corporations should hire CEOs externally or promote from within the firm. This practice lacks theoretical generalization and conclusive empirical evidence. We draw from TCE, and use a large-scale data set to investigate how firm diversification affects this "make-buy" decision.

---

**065-1206**  
**Title:** Using Data Envelopment Analysis to Evaluate the Performance of Individual Firms within Clusters  
**Authors:** Jaime Oliveira, Student, Fundacao Getulio Vargas, Brazil, Luiz Di Serio, Professor, Fundacao Getulio Vargas, Brazil

Empirical evidence of the relationship between agglomeration and firm performance is still fragile. Using data envelopment analysis, we will evaluate the performance of individual firms within clusters and identify gaps in production efficiency. Our research intends to contribute to specific policies that improve the firms' microeconomic efficiency (Porter, 2000).

---

**065-1350**  
**Title:** Does Higher Production Resilience Lead to a Higher Sales and Stock Price Resilience?  
**Authors:** Milad Baghersad, Student, Virginia Polytechnic Institute And State University, United States, Christopher Zobel, Professor, R.B. Pamplin Professor of BIT, United States

Previous studies have shown that supply chain disruptions have a negative impact on operating income, sales, and long-run stock price. Magnitude and duration of disruptions influence the amount of negative impacts. We empirically investigate the relation between companies’ production resilience and other performance measures.

---

**065-0382**  
**Title:** How Top Management Championship Influences Outsourcing Performance? The Role of a Formal Logistics Strategy  
**Authors:** Wenwen Zhu, Student, South China University of Technology, China, Zhiquang Wang, Associate Professor, South China University of Technology, China, Xiane Zhao, Professor, China Europe International Business School, China

This study examines how top management championship influences logistics outsourcing performance through its effect on the extent of outsourcing and outsourcing management processes in China. The results show that the role of top management championship on logistics outsourcing and outsourcing performance is contingent on whether the firm has a formal logistics strategy.

---

**065-1045**  
**Title:** A Unified Framework for Credit Evaluation of Internet Start-Ups: Multi-Criteria Analysis through AHP and DEA  
**Authors:** Mehele Basu, Student, University of Pittsburg, United States, Wei GU, Assistant Professor, University of Science & Technology, China
We present a multi-criteria decision-making framework for Internet finance companies based on the interface of the subjective approach of AHP and the objective approach of DEA to identify the most critical financial, operations, and sales factors in evaluating the credit index of small-medium enterprises and start-ups.

**Session:** Efficient Operations  
**Chair(s):** Roger Solano

**065-0168 OEE (Overall Equipment Effectiveness) - Global Efficiency of Equipment as the Competitiveness Support Instrument**  
Glaucio Silva, Student, Universidade Nove De Julho, Brazil  
Milton Vieira Junior, Professor, Universidade Nove De Julho, Brazil  

Brazilian manufacturing has faced stiff competition from factories worldwide, requiring monitoring of crucial factors to remain competitive. This paper aims to make an exploratory evaluation of the use of OEE (Overall Equipment Effectiveness) indicator in order to analyze the impacts of this indicator on the cost of maintenance.

**065-1968 Operational Capabilities: A Multi-Case Study**  
Marcia Scarpin, Student, Fundacao Getulio Vargas, Brazil  
Ana Biselli, Student, Fundacao Getulio Vargas, Brazil  
Michele Esteves Martins, Student, Fundacao Getulio Vargas, Spain  
Luiz Brito, Professor, Fundacao Getulio Vargas, Brazil  

We analyzed how operational capabilities are developed. For this, we used four cases and fifty-two respondents. We observed that operational practices help in the shaping of operational capabilities, and that these have different levels of maturity within and among firms.

**065-0235 Completeness Analysis of AVL Data in a Rural Transit System**  
Roger Solano, Associate Professor, Slippery Rock University, United States  
Dong Nguyen, Student, Slippery Rock University, United States  
Matthew Hart, Student, Slippery Rock University, United States  
Chad Bender, Student, Slippery Rock University, United States  
Tylor Tustin, Student, Slippery Rock University, United States  

The current study analyzes Automatic Vehicle Location (AVL) data in a rural transportation system. We study data completeness and missing values. The study identified patterns in the missing values that point to problems in the system implementation. Solutions and partial results are discussed.

**Session:** Revenue management and Pricing  
**Chair(s):** Seyed Mohammad Hossein Mousavi

**065-0534 Uncertain Price Competition in a Duopoly with Heterogeneous Availability**  
Mohammad Hassan Lotfi, Student, University of Pennsylvania, United States  
Sawati Sarkar, Professor, University of Pennsylvania, United States  

We consider multi-unit price competition in a duopoly with uncertainty of competition and an arbitrary number of buyers, characterize the set of necessary and sufficient properties for the Nash Equilibrium strategies, and provide an algorithm to compute the pricing strategies. The motivating applications are micro-grid, secondary spectrum, and non-neutral networks.

**065-1267 Pricing for Internet Sales Channels in a Car Rental Company**  
Beatriz Oliveira, Student, Faculty of Engineering of University of Porto and INESC TEC, Portugal  
Maria Antónia Carravilla, Associate Professor, Faculty of Engineering of University of Porto and INESC TEC, Portugal  
Jose F. Oliveira, Associate Professor, Faculty of Engineering of University of Porto and INESC TEC, Portugal  

We develop a pricing system for a Portuguese car rental company that aids price for ‘price-comparison e-brokers.’ The system monitors market prices and sends regular price updates. Following an adaptive heuristic based on desired and actual occupation levels and implementing the company's business sensitivity and strategy.

**065-1524 Market Prices for Call Centers with Co-Sourcing**  
Neda Mirzaeian, Student, University of Pittsburg, United States  
Seyed Mohammad Hossein Mousavi, Assistant Professor, University of Pittsburg, United States  
Jeffrey Kharoufeh, Associate Professor, University of Pittsburg, United States  

Motivated by the co-sourcing market in call center industry, we consider a service network consisting of multiple service centers that offload some of their demand to external providers at a market price with the aim of reducing customer delays and the customer abandonment rate. We characterize the optimal proportion of demand that should be co-sourced, as well as the equilibrium market price. Additionally, the asymptotic behavior of this equilibrium is examined under different regimes.

**Session:** Modeling product returns in closed loop supply chains  
**Chair(s):** Dennis Yu

**065-1193 Stochastic Models for Optimal Returnable Transport Items**  
xiangxiang Fan, Student, Huazhong University of Science & Technology, China  
Xianhao Xu, Professor, Huazhong University of Science & Technology, China  
Bipan Zou, Student, Huazhong University of Science and Technology, China  
Yeming Gong, Associate Professor, EMLYON Business School, France
We formulate semi-open queuing networks to evaluate decisions regarding returnable transport items (RTIs) in closed-loop supply chain (for instance, who should own the RTIs: the manufacturer, the supplier, or the 3pl warehousing operator?). The objective is to minimize the number of RTIs and the cycle time.

Our proposed model aims to facilitate enterprises in assessing their product recovery system capability, and in improving overall performance. The proposed model is a natural extension of several established policies for conventional reverse supply chains and can be verified on a simulation platform.

We study the impact of modularity on product returns when customer demand depends on both price and modularity level. Optimal price and production quantity are solved as functions of product modularity level with consideration of demand uncertainty. Insights and implications on sustainability management are derived from our structural and numerical results.

A significant portion of consumer returns are false failures with no defects. We consider a supply chain setting with one manufacturer, who decides on design quality, and one retailer, who decides on informational efforts, both affecting the false failure rates. We study supply chain coordination avenues under various value recovery scenarios.

In this paper, we identify appropriate performance goals and financial metrics through the analysis of queuing models. We characterize and compare various performance metrics for two types of animal shelters. Furthermore, we formulate an optimization model which maximizes a weighted average of the financial and performance metrics.

Performance measurement is an essential path for developing the field of Sustainable Supply Chain Management (SSCM). Previous literature identifies obstacles for assessing economic, environmental, and social performances needed to achieve sustainability, especially social. This research identifies and analyzes critical performance measures in SSCM.

This paper seeks to understand enabling/constraining sustainability dimensions in oil and gas supply chains within developing economies. By adopting an analytic dualism approach, this study seeks to unpack the complex interdependencies between the agent (operations manager) and the structure (organization/region context) and provide a clear focused line of inquiry on agential factors.

The global coffee supply chain has many nodes that add value through collection, intermediate processing and distribution. However, this complex supply chain places significant downward pressure on farmer incomes. This study looks at direct-trade coffee as a form of vertical integration, examining examples that significantly advance value capture for farmers.

We present a methodology for assessing the impact of component-level energy technology investments for the Department of Defense (DoD) under conditions of uncertainty. Applying modern portfolio theory, we evaluate the benefit-cost of the technologies that compose the DoD's energy systems, including its independent micro-grid system.

We formulate semi-open queuing networks to evaluate decisions regarding returnable transport items (RTIs) in closed-loop supply chain (for instance, who should own the RTIs: the manufacturer, the supplier, or the 3pl warehousing operator?). The objective is to minimize the number of RTIs and the cycle time.
Unlike previous studies which mostly utilize optimization models, we study optimal site selection for electric vehicle charging stations as a multi-criteria decision-making problem. We create a comprehensive evaluation system and use fuzzy AHP-TOPSIS to select the optimal site.

065-0398  Effects of Public Charging Stations on Consumer Interest in Purchasing Electric Vehicles
Ailing Fan, Student, Huazhong University of Science and Technology, China
Chao Yang, Professor, Huazhong University of Science & Technology, China

We seek to identify a statistically-significant relationship between availability of public charging stations and consumers' interest in purchasing electric vehicles. The results of a questionnaire designed based on relevant literature shows that charging locations, time, and cost have a large influence on consumers' purchase intentions.

065-1954  Analysis of Enhanced Oil Recovery of Mature Oil and Gas Fields: Using Analytical Hierarchy Process
Renato Vivas, Professor, Universidade Federal da Bahia, Brazil
Francisco Freires, Associate Professor, Universidade Federal da Bahia, Brazil

Oil recovery techniques can be implemented to increase production efficiency. We analyze methods of enhanced oil recovery used in mature wells, following criteria of sustainability and applying an Analytical Hierarchy Process.

065-0440  Energy Efficiency Frameworks: A Literature Overview
Giulia Saldanha, Student, Pontificia Catholic University of Parana, Brazil
Sergio Gouvea da Costa, Professor, Pontificia Catholic University of Parana, Brazil
Edson Pinheiro de Lima, Associate Professor, Pontificia Catholic University of Parana, Brazil

The manufacturing industry depends on energy, an increasingly scarce resource. Taking this into account, companies seek to use energy resources efficiently. We present a systematic literature review on frameworks used for the implementation of energy efficiency, as a preliminary study of the field.

065-0631  Value of Advanced Demand Information in Supply Chains
Prashant Chintapalli, Student, University of California Los Angeles, United States
Stephen Disney, Professor, Cardiff University, United Kingdom
Christopher Tang, Professor, University of California Los Angeles, United States

We investigate a supply chain contract between a manufacturer and supplier under advanced demand information. Originally, the manufacturer satisfies observed demand with unit lead-time. In the advanced demand case, the supplier offers a discount to encourage the manufacturer to order before the demand is observed, with a two period lead-time.

065-0398  Effects of Public Charging Stations on Consumer Interest in Purchasing Electric Vehicles
Ailing Fan, Student, Huazhong University of Science and Technology, China
Chao Yang, Professor, Huazhong University of Science & Technology, China

Increasing competition leads quality to become widely regarded as a key element for success in business. Through an empirical survey, we prove that companies which measure cost of quality have a significantly higher ROS. We examine which technologies and organizational concepts enable monitoring quality costs.

065-0547  Achievements and Drawbacks of a PPC Software Implementation in a Brazilian Printed Circuit Boards Manufacturer
Neemias Ferreira, Student, CEEETEPS - Centro Estadual de Educação Tecnológica Paula Souza, Brazil
065-0343  Outsourcing Supplier Selection: Quality-Driven Demand and Taguchi Loss Function
Yanni Ping, Student, Drexel University, United States
Seung-Lae Kim, Professor, Drexel University, United States
Min Wang, Assistant Professor, Drexel University, United States

Facing limited capacity, a manufacturer would strategically consider capacity expansion or outsourcing. Outsourcing reduces initial investment but remains risky; uncertain quality could affect downstream demand. We present a finite-horizon dynamic model to explore how quality affects manufacturer's outsourcing strategies, and provide some managerial insights.

065-1015  Capturing Value Creation Architectures for Smart Manufacturing
Sabine Baumann, Professor, Jade Hochschule, Germany
Christoph Wunck, Professor, Jade University, Germany
Oliver Eulenstei, Professor, Iowa State University, United States

We develop value creation architectures for smart manufacturing to capture competitive advantages resulting from both the interplay of actors within architectures and inter-architecture competition. The analysis covers value appropriation of actors and resulting impacts on contributions towards the overall architecture value, in order to assess the competitive advantages of different architectures.

065-1445  Managing Trade-Offs in Protein Manufacturing: How Much Is Too Much Waste?
Tugce Martagan, Assistant Professor, Eindhoven University of Technology, Netherlands
Ananth Krishnamurthy, Associate Professor, University of Wisconsin Madison, United States

We consider manufacturing trade-offs for engineer-to-order proteins. The biomanufacturer needs to determine how much protein to produce, and then how much of it to waste in subsequent operations because of the purity and yield trade-offs. We develop a Markov decision model, and determine structural characteristics of the optimal operating policies.

065-0497  Ideation-Execution Transition in Product Development: Experimental Analysis
Evgeny Kagan, Student, University of Michigan Ann Arbor, United States
Stephen Leider, Assistant Professor, University of Michigan Ann Arbor, United States
William Lovejoy, Professor, University of Michigan Ann Arbor, United States

We study experimentally the effect of transition time between ideation and execution, and the effect of decision control on performance in product development. We find that decision rights, but not the time allocation, affects performance, and that performance differences are explained by better selection and implementation ability, not idea quality.

065-0033  Parallel Innovation Efforts: Policies and Insights
Izack Cohen, Assistant Professor, Technion Israel Institute of Technology, Israel

An innovation effort can lead to a successful product or to a failed one. We consider parallel efforts as a strategy for increasing the expected net profit under uncertain innovation outcomes. We characterize the problem, find some of its structural properties, and develop optimal and near-optimal dynamic management policies.

065-1494  Strategic Investments by Platforms to Facilitate Consumer and Developer Adoption
Burcu Tan Erciyes, Assistant Professor, Tulane University, United States

In order to get both sides on board, two-sided platforms may subsidize one side of the market, provide first-party content, or provide third-party development tools. We analyze these strategic levers using a dynamic model and determine the optimal strategies at different stages of the platform life cycle.

065-0947  Technology Leaking and Sourcing Strategies
Hsiao-Hui Lee, , University of Hongkong, China
Haiping Hui, PhD student, The University of Hong Kong, Hong Kong

We analyze a buyer's sourcing strategy when it can learn from its innovative (but expensive) supplier and leaks the technology to its un-innovative (but cheap) supplier. The buyer considers the cost savings from its technology leaking and the loss of died-heart fans leaving because of the change of suppliers.

065-0818  Key Success Factors for Starting a New Venture, in the Opinion of Successful Micro and Small Business Entrepreneurs
Luiz Alves, Professor, Universidade Federal De Juiz De Fora, Brazil
Izabella Silva, Student, Universidade Federal De Juiz De Fora, Brazil

A discussion of the challenges of business startup in an emerging, and historically unstable, economy. We evaluate, through a survey with successful micro- and small-business entrepreneurs in southeastern Brazil, the importance of having or not having a business plan. The results show that perseverance and innovation outweigh a good business plan.

065-0513  Cognitive Social Capital and Project Success: The role of knowledge acquisition and exploitation
Kwasi Amoako-Gyampah, Professor, University of North Carolina Greensboro, United States
Ebenezer Adaku, Lecturer, GIMP, Ghana
Samuel Famiyeh, Senior Lecturer, Ghana Institute of Management, Ghana
Moses Acquaah, Professor, University of North Carolina Greensboro, United States

Cognitive social capital (e.g., norms/values, trust, reciprocity), is expected to contribute to project success. However, the manner in which this occurs has not received much attention. Using data from Ghana we provide findings on the contributions of cognitive social capital to project success by way of knowledge acquisition and exploitation.

065-1976  Understanding Innovation Capability in Micro Enterprises
Aysegul Kop, Student, University of Aberdeen, United Kingdom
G. Gurkan Inan, Student, heriot watt university, United Kingdom
Umit Biltici, Professor, Heriot-Watt University, United Kingdom

We develop a conceptual model with consideration of differences between different size enterprises to understand how innovation capability develops in Microenterprises. Our case study results suggest that leadership skills and participative culture are internal factors; and customer engagement, networking, and collaboration are external factors that underpin the development of innovation capability in micro enterprises.

065-0419  Monday, 08:00 AM - 09:30 AM, Azalea  
**Track:** Supply Chain Risk Management  
**Session:** Detecting and Assessing Vulnerabilities  
**Chair(s):** Mert Hakan Hekimoglu

065-0403  Developing a Supply Chain Stress Test

065-1629  Cross-Functional Approaches for Teaching Operations Management and Product Design Courses
Jennifer Bailey, Assistant Professor, Babson College, United States
Benjamin Luipold, Assistant Professor, Babson College, United States
Benjamin Linder, Professor, Olin College of Engineering, United States
James Read, Professor, Massachusetts College of Art & Design, United States

We present the process and content for teaching two interdisciplinary courses. First, our cross-functional Operations Management course is taught in conjunction with Managerial Accounting. Second, our cross-functional Product Design course is a collaboration across three colleges - Babson College, Olin College of Engineering and Massachusetts College of Art & Design.

065-1192  Leadership by Design through Innovation, Collaboration, and Entrepreneurship
Debasish Mallick, Associate Professor, University of St. Thomas, United States

We focus on leadership development through a project-based experiential learning approach.

065-1302  Student and Organizational Outcomes of Learning Lean by Doing
Wiljeana Glover, Assistant Professor, Babson College, United States

Project-based P/OM courses claim to yield higher levels of learning and benefits for the participating project organizations, but with little research supporting this claim. We describe the student learning and organizational-based outcomes of a series of projects conducted as a part of a Lean/TPS "learning by doing" course.

065-1230  Revenue Maximization in Sequential B2B Auctions
Selcuk Karabati, Professor, Koc University, Turkey
Cem Ozturk, Assistant Professor, Georgia Institute of Technology, United States

We consider the item sequencing problem in multi-item auctions and study the impact of buyers' strategic behavior, such as bid-shading observed in sequential online auctions, on seller's revenue. We simulate a set of problems by calibrating key parameters of the sales context using a B2B used car auction data set.

065-1387  An Analysis of Subsidy Programs in the Agriculture Industry
Foad Iravani, Assistant Professor, University of Washington, United States
Saeed Alizamir, Assistant Professor, Yale University, United States
Hamed Manami, Assistant Professor, University of Washington, United States

The U.S. government offers subsidy programs to protect farmers when crop yields drop significantly due to bad weather conditions. We analyze the impact of different agricultural subsidy programs on farmers' production decisions.

065-0413  New Product Launch: The Impact of Competition and Product Differentiation
Xishu Li, Student, Rotterdam School of Management, Netherlands
Rob Zuidwijk, Professor, Rotterdam School of Management, Netherlands

We study the optimal capacity and pricing strategies for launching a new product. This is an evolutionary process in which the new product competes with and gradually replaces the existing product under uncertain consumer valuation. Moreover, the firm faces an imitator follower in the competition for the new product.

065-1084  Leap -- and the Net Will Appear
Sebastian Fixson, Associate Professor, Babson College, United States

As the core element of Babson’s new Master in Management in Entrepreneurial Leadership (MSEL) program, we developed a two-semester learning experience that integrates three disciplines around a team-based innovation project (LEAP - Leading Entrepreneurial Action Project). We report on the pedagogy, benefits, and challenges of our approach.

065-1976  Understanding Innovation Capability in Micro Enterprises
Aysegul Kop, Student, University of Aberdeen, United Kingdom
G. Gurkan Inan, Student, heriot watt university, United Kingdom
Umit Biltici, Professor, Heriot-Watt University, United Kingdom

We develop a conceptual model with consideration of differences between different size enterprises to understand how innovation capability develops in Microenterprises. Our case study results suggest that leadership skills and participative culture are internal factors; and customer engagement, networking, and collaboration are external factors that underpin the development of innovation capability in micro enterprises.
Borrowing a concept from the financial sector, we propose an approach to developing a "stress test" to determine the ability of a given supply chain to deal with crises under extreme, but plausible, scenarios. Managers can use such a tool to assess the risk resilience of their respective supply chains.

**065-1498 Managing Supply Chain Disruption: A Scenario Building Approach**

Christopher Kwaramba, Student, Virginia Polytechnic Institute and State University, United States

Robertta Russell, Professor, Virginia Polytechnic Institute and State University, United States

Quinton Nottingham, Associate Professor, Virginia Polytechnic Institute and State University, United States

We illustrate the use of a scenario generation technique in conjunction with Interpretive Structural Modeling (ISM) for the identification of critical supply chain risks with high driver and dependence power (linkage risks) and chains of dependent events in terms of the consequences while considering the probability of the events.

**065-1628 Omni-Channel as a Buffer against Supply Chain Disruptions**

Mert Hakan Hekimoğlu, Student, Syracuse University, United States

John Park, Assistant Professor, Syracuse University, United States

Burak Kazaz, Associate Professor, Syracuse University, United States

We develop a new risk exposure index for various infrastructures in a large retail supply chain. We identify detrimental disruptions and consider metrics with excess capacity at distribution centers and fulfillment centers that can serve as backup facilities. We examine the benefits of establishing an omni-channel infrastructure from a business-continuity perspective.

**492 Monday, 08:00 AM - 09:30 AM, Begonia**

**Track: Supply Chain Analytics**

**Chair(s): Maxime Cohen**

**065-0551 Omni-Channel Retail Analytics for Integrated Pricing and Fulfillment Planning**

Pavithra Harsha, Research Staff Member, IBM Research, United States

Shiva Subramanian, Research Staff Member, IBM, United States

Joline Uichanco, Assistant Professor, University of Michigan Ann Arbor, United States

In an omni-channel environment, inventory is shared across channels through multiple fulfillment options. We present a tractable optimization model to determine optimal lifecycle channel prices, inventory allocations and partitions across channels that maximizes the total profit. Experiments show a 6-12% improvement in revenue over multiple categories for a large retailer.

**065-0670 Feature-Based Dynamic Pricing**

Maxime Cohen, Research Scientist, Google, United States

Nitin Korula, Research Scientist, Google, United States

We consider the problem of pricing in an online fashion highly differentiated products described by vectors of features (e.g., impressions in online ads). The firm does not know the values of the different features and needs to learn it. We propose an algorithm with low worst-case regret.

**065-0860 A Dynamic Clustering Approach to Data-Driven Assortment Personalization**

Sajad Modaresi, Student, Duke University Durham, United States

Fernando Bernstein, Professor, Duke University Durham, United States

Denis Saure, Assistant Professor, Universidad De Chile, Chile

A retailer faces heterogeneous customers with unknown preferences. The retailer can personalize assortments using customers' profiles; however, customers with different profiles may have similar preferences. Thus, the retailer benefits from aggregating information among customers with similar preferences. We propose a dynamic clustering approach that adaptively adjusts customer segments to maximize revenue.

**065-1362 Managing Product Transitions via Strategic Customer Segmentation**

Adam Elmahctoub, Assistant Professor, Columbia University, United States

Vineet Goyal, Associate Professor, Columbia University, United States

Roger Lederman, Research Staff Member, IBM, United States

We describe a framework for managing product transitions, including the role that sales targeting can have in shaping customer decisions, managing inventory, and increasing revenue. We provide algorithms that select customers dynamically, each with their own choice model, in order to maximize revenue from a limited supply of inventory.

**493 Monday, 08:00 AM - 09:30 AM, Camellia**

**Track: Environmental Operations Management**

**Chair(s): Georgi Alekseev**

**065-1646 The Worst Environmental Disaster in Brazil and Its Impact**

Susana Pereira, Associate Professor, Fundacao Getulio Vargas, Brazil

Andre Ravara, Logistic Director, VLI Logistica, Brazil

Janaína Siegler, Assistant Professor, Haile/US Bank College of Business, United States

Barbara Flynn, Professor, Indiana University, United States

In November 2015, Brazil faced its worst environmental disaster as a result of the collapse of two mining dams that destroyed cities and rivers for thousands of kilometers. We seek to understand the impact of this event on the source firm's supply chain and on other supply chains as well.

**065-0336 The Green Supply Chain in the Food Packaging Industry: A Bibliometric Analysis**

Antonio Tavares, Student, Universidade Nove De Julho, Brazil

Rosangela Vanalle, Professor, Universidade Nove De Julho, Brazil

Geraldo Oliveira Neto, Associate Professor, Universidade Nove De Julho, Brazil

We seek to understand the impact of this event on the source firm's supply chain and on other supply chains as well.
An awareness of "green" aspects is essential in supply chains. The packaging must not only preserve the product, but must allow for marketing media while remaining environmentally sound. We present a bibliometric analysis for the theme Green Supply Chain on the Food Packaging Industry.

**065-0364 Reducing Greenhouse Gas Emissions Through Green Supply Chain Practices in the UK Chemical Industries**

Arvind Upadhyay, Senior Lecturer, University of Brighton, United Kingdom
Md Mostain Belal, Student, LSC - Cardiff Metropolitan University, United Kingdom
Hector Victoria, Lecturer, LSC-Cardiff Metropolitan University, United Kingdom
Mohammed Chowdhury, Student, LSC - Cardiff Metropolitan University, United Kingdom

Despite the research linking green supply chain management practices (GSCMP) and environmental performance, research to date has rarely focused on reducing greenhouse-gas emissions using these methods. We examine the relationship between GSCMP and GHGe utilizing multiple regression, analyzing data collected from 45 environmental reports from the United Kingdom and applying quantitative analysis methods.

**065-1480 Sustainability Trends in Pharmaceutical Supply Chains**

Georgi Aleksiev, Student, University of Strathclyde, United Kingdom
Athanasios Rentzelas, Lecturer, University of Strathclyde, United Kingdom

In past decades, the importance of the sustainable supply chain has evolved. We investigate sustainability trends in pharmaceutical supply chains with a primary focus on the environmental aspect of sustainability. We examine industry-specific sustainability practices, barriers and enablers, and how they interact with each other in order to achieve excellence.

**065-1501 Measuring Efficiency of Operation and Service Quality Objectives in the Banking Industry**

Dong-Shang Chang, National Central University, Taiwan, Republic of China
Shih-Heng Yu, Student, National Central University, Taiwan, Republic of China

Numerous studies have measured operating efficiency in the banking industry, but only a few studies have emphasized the effects of service failure. We apply TOEFA to additionally consider service quality objectives. Our findings offer a reference to plan service recovery strategies and to reasonably identify the ideal benchmarks.

**065-1549 Risk Management in Insurance Firms: Towards a Theory of Collaborative Risk Management**

Elena Nesterova, Student, York University, Canada
David Johnston, Professor, York University, Canada

Drawing on the theoretical perspectives of the risk management literature and High Reliability Theory, we conduct case studies of insurance services firms and explore how intra-organizational collaboration affects risk management decisions. Our proposed theoretical contingency model describes the relationships among organizational structures, risk characteristics, forms of collaborations and decision effectiveness.

**065-1521 Service Recovery When the Firm Has Not Failed to Deliver**

Amitkumar Kakkad, Assistant Professor, University of San Diego, United States

We review the extant literature on service recovery, and propose a framework for a distinct category of service failures that the current literature does not address adequately: recovering from service failures when it is not the firm that has failed to deliver.

**065-1523 Designed to Recover: New Service Design That Anticipates Service Recovery**

Amitkumar Kakkad, Assistant Professor, University of San Diego, United States

We review the extant literature on service recovery, and propose a framework for New Service Design that anticipates service failures and the resultant need for service recovery. We develop and validate propositions through a case study of six service firms, and tested them through a wide-scale survey of service firms.

**065-0185 Classroom Utilization and Student Satisfaction**

Albena Ivanova, Associate Professor, Robert Morris University, United States

The study investigates the factors that impact students' satisfaction with classroom attributes and the impact of classroom utilization on the satisfaction.

**065-0720 Online Education, Content Matching and Competition: An Integrative Framework.**

Vashkar Ghosh, Student, University of Florida, United States
Gulver Karamemis, Student, University of Florida, United States
Asos Vakharia, Professor, University of Florida, United States

Innovation and technological advancement are eliminating a lot of constraints, bringing sweeping changes to higher education. We identify the key parameters that impact a university's incentive to offer online program in addition to on-campus program. We also consider reputation effects and how they moderate a university's decision to offer an online program.

**065-0199 Evaluation of Satisfaction of Operations Management by Consumers of an Educational Services Company**

Tonny Rodrigues, Associate Professor, COPPEAD Graduate Business School / Federal University of Rio de Janeiro, Brazil
Micaela Silva, Student, Faculdade Santo Agostinho, Brazil
Átila Lira, Associate Professor, Universidade Paulista - Unip, Brazil
Francisco Freires, Associate Professor, Universidade Federal da Bahia, Brazil

This research aims to evaluate the satisfaction of operations management by consumers in an educational services company. The main results show that the factor "teacher" is the one with greater interference in the satisfaction of operations management of: a) class; b) used methodology; and c) teaching materials.
This research aims to demonstrate how an educational services company can improve its operations management planning. The main results show that the factors most in need of operations management planning are: time management of administrative operations, prior organization of educational operations, and monitoring of teachers in the classroom.

**Modelling the Efficiency of Disaster Management Apps**

**Chair(s):** Michael Klafft

Smartphone apps for disaster management provide functionalities like crisis communication, alerting, and organization of first responders or volunteer work during recovery. But how efficient can such tools be? We assess the performance of disaster management apps based upon theoretical considerations, and some practical data gathered from field experiments.

**Innovation in Mobility: A Futuristic Approach for Humanitarian Logistics**

**Chair(s):** Michael Klafft, Professor, Jade University of Applied Sciences, Germany

The future of mobility is heading towards autonomy at an exponential rate; this change would have an impact on the transportation of both passengers and goods. Keeping in view the expected rapid adaptation of self-driving cars, we evaluate their possible impact on humanitarian logistics.

**Disaster Management: The Marriage of POM and IT Officiated by Social Media**

Social Media (SM) can provide additional operational capabilities in Disaster Management while reducing coordination overhead, significantly improving the effectiveness of DM. We describe how POM can work with IT to determine how SM can be structured and focused to play a powerful central role in managing disasters.
1. **Seung Hwan Jung**, Student, Washington University St Louis, United States

**Rationale for Supply Partnership with a Downstream Rival**

We examine the implications of servitization in the context of supply partnership with a downstream rival. This approach has been increasingly adopted as a strategy to enhance value creation and capture the benefits of servitization throughout the value chain. The servitization strategy has been successfully implemented in certain industries, which has led to a unbalanced power and trust in the supply chain. We conclude that servitization can be a valuable tool for supply partnership in certain circumstances.

2. **Nikolaos Georgantzis**, Professor, University of Reading, United Kingdom

**Digital Servitization: An Analysis of Power in the Digital Value Chain**

This study investigates the dynamics of power in the digital value chain and how servitization can influence the distribution of power. We find that servitization can reduce imbalances in power but can also increase the complexity of the digital value chain. This study contributes to the understanding of servitization and power distribution in the digital value chain.

3. **Brian Maeng**, Assistant Professor, Pacific Lutheran University, United States

**A Game Approach to Collaboration among Transportation Companies**

We propose a game-theoretic approach to model cooperation among transportation companies. We examine the interaction between various transportation companies through a game-theoretic model and find that there exist situations in which cooperation is beneficial for all parties involved. This research contributes to the understanding of cooperation in the transportation industry.

4. **Miguel Estrada**, Professor, Ipade Business School, Mexico

**Knowledge Sharing for Reactive Manufacturing Capacity: A Non-Cooperative Game-Theoretic Approach for a Cluster**

We investigate the dynamics of knowledge sharing in a cluster and find that knowledge sharing can improve the reactive manufacturing capacity. We propose a non-cooperative game-theoretic model to study the knowledge sharing behavior of firms in a cluster. This research contributes to the understanding of knowledge sharing in a cluster.

5. **Omkarprasad S Vaidya**, Assistant Professor, Indian Institute of Management Lucknow, India

**Post-Disaster Waste Management for Sustainable Humanitarian Logistics Operations**

We study the impact of post-disaster waste management on sustainable humanitarian logistics operations. We find that effective waste management is crucial for sustainable humanitarian logistics operations. We propose a model to optimize waste management in post-disaster scenarios. This research contributes to the understanding of waste management in humanitarian logistics operations.

6. **M Reza Abdi**, Assistant Professor, Bradford University, United Kingdom

**Hybrid Models to Support Humanitarian Operations Management**

We propose hybrid models to support humanitarian operations management. We find that hybrid models can effectively support humanitarian operations management. This research contributes to the understanding of humanitarian operations management.

7. **Hugo Yoshizaki**, Associate Professor, University of São Paulo, Brazil

**Prioritization Models in Humanitarian Operations: A Systematic Review of the Literature**

We conduct a systematic review of the literature on prioritization models in humanitarian operations. We find that prioritization models are crucial for effective humanitarian operations. This research contributes to the understanding of prioritization models in humanitarian operations.

8. **Dongli Zhang**, Associate Professor, Fordham University, United States

**The Influence of Trust on Supply Chain Coordination Practices and Performance**

We study the impact of trust on supply chain coordination practices and performance. We find that trust is crucial for effective supply chain coordination. This research contributes to the understanding of trust in supply chain coordination.

9. **Seung Hwan Jung**, Student, Washington University St Louis, United States

**Digital Servitization: An Analysis of Power in the Digital Value Chain**

We propose a framework to analyze the power dynamics in the digital value chain. We find that servitization can significantly alter the power dynamics in the digital value chain. This research contributes to the understanding of servitization and power dynamics in the digital value chain.
### Monday, 09:45 AM - 11:15 AM

**065-1660** Are Penalties "Sticky" in the Long Term? An Empirical Investigation in U.S. Nursing Homes  
Rachna Shah, Associate Professor, University of Minnesota, United States  
Gopalakrishnan Narayananurthy, Student, Indian Institute of Management Kozhikode, India  
Aanand Gurumurthy, Associate Professor, Indian Institute of Management Kozhikode, India  

Are fines and penalties punitive or beneficial for a firm's performance? How long does this effect last? These questions have not been examined by previous researchers. We use secondary data from nursing homes in the U.S. to examine the "stickiness" of penalties on a facility's future quality rating.

---

**050-1810** Predicting Unscheduled Needs for an Outpatient Clinic Schedule  
Brenda Courtrad, Student, University of Cincinnati, United States  
Michael Magazine, Professor, University of Cincinnati, United States  

Using the current patient population's information for an outpatient cancer clinic, we predict the need for unscheduled visits and services. We create a schedule to accommodate these predicted needs with the objective of reducing patient wait times and increasing access for these unscheduled patients.

---

**065-1595** Impact of Healthcare Reform on Hospital Suppliers  
Sayan Mukherjee, Student, Xavier Labor Relations Institute, India  
David Dobrzykowski, Assistant Professor, Rutgers University, United States  
Alok Baveja, Professor, Rutgers University, United States  

Healthcare reform and information technologies are receiving substantial attention among hospitals. However, little is known about how these issues affect the manufacturers supplying key materials to hospitals. We examine data from 377 bio-medical and pharmaceutical manufacturers to reveal important relationships among healthcare reform, supply chain issues, and technology investment.

---

**050-1810** Predicting Unscheduled Needs for an Outpatient Clinic Schedule  
Brenda Courtrad, Student, University of Cincinnati, United States  
Michael Magazine, Professor, University of Cincinnati, United States  

Using the current patient population's information for an outpatient cancer clinic, we predict the need for unscheduled visits and services. We create a schedule to accommodate these predicted needs with the objective of reducing patient wait times and increasing access for these unscheduled patients.

---

**050-1810** Predicting Unscheduled Needs for an Outpatient Clinic Schedule  
Brenda Courtrad, Student, University of Cincinnati, United States  
Michael Magazine, Professor, University of Cincinnati, United States  

Using the current patient population's information for an outpatient cancer clinic, we predict the need for unscheduled visits and services. We create a schedule to accommodate these predicted needs with the objective of reducing patient wait times and increasing access for these unscheduled patients.

---

**050-1810** Predicting Unscheduled Needs for an Outpatient Clinic Schedule  
Brenda Courtrad, Student, University of Cincinnati, United States  
Michael Magazine, Professor, University of Cincinnati, United States  

Using the current patient population's information for an outpatient cancer clinic, we predict the need for unscheduled visits and services. We create a schedule to accommodate these predicted needs with the objective of reducing patient wait times and increasing access for these unscheduled patients.

---

**050-1810** Predicting Unscheduled Needs for an Outpatient Clinic Schedule  
Brenda Courtrad, Student, University of Cincinnati, United States  
Michael Magazine, Professor, University of Cincinnati, United States  

Using the current patient population's information for an outpatient cancer clinic, we predict the need for unscheduled visits and services. We create a schedule to accommodate these predicted needs with the objective of reducing patient wait times and increasing access for these unscheduled patients.

---

**050-1810** Predicting Unscheduled Needs for an Outpatient Clinic Schedule  
Brenda Courtrad, Student, University of Cincinnati, United States  
Michael Magazine, Professor, University of Cincinnati, United States  

Using the current patient population's information for an outpatient cancer clinic, we predict the need for unscheduled visits and services. We create a schedule to accommodate these predicted needs with the objective of reducing patient wait times and increasing access for these unscheduled patients.
Monday, 09:45 AM - 11:15 AM

Rafay Ishfaq, Assistant Professor, Auburn University, United States
065-0418
Evaluation of Order Fulfillment Options in Omni-Channel Retail Supply Chain

Ozgen Karaer
Session: Multichannel Retail Operations
Retail Operations Management
Track: Monday, 09:45 AM - 11:15 AM, Veranda

We study the practice of flipping rooms, a scheduling policy in which a single surgeon is assigned to and alternates (flips) between two operating rooms over the course of the day. We compare the performance of the flip room scheduling policy to a more traditional, serial scheduling policy.

065-1545 Dynamic Appointment Scheduling for Elective Surgeries Under Bed Capacity Constraints
Chengyu Wu, Student, Duke University Durham, United States
Li Chen, Associate Professor, Cornell University, United States

We study the problem of scheduling elective surgeries while seeking to provide patients with specific surgery dates immediately, which also takes into account the instant ICU occupancy to reduce ICU diversions. We present an algorithm and then validate it using real hospital data.

065-1409 Improvement of Performance Indicators in Hospitals: An Innovative Approach Through Computational Optimization
João Chang Junior, Associate Professor, Campus Sao Bernardo do Campo, Brazil
Raphael Cruz, Student, Campus Sao Bernardo do Campo, Brazil
Gabriela Scur, Professor, Campus Sao Bernardo do Campo, Brazil
Alfredo da Silva Fernandes, Professor, Instituto do Coracao da Faculdade de Medicina da USP, Brazil

We focus on the development of a computational algorithm optimization to solve the sequencing problem of cardiac elective surgeries. We study a way reduce the waiting time for surgeries, as well as maximize the use of hospital resources, i.e. to serve more patients without the need for investment in overtime payments.

065-1055 Evidence of Strategic Behavior in Medicare Claims Reporting
Hamsa Bastani, Student, Stanford University, United States
Joel Goh, Assistant Professor, Harvard University, United States
Mohsen Bayati, Assistant Professor, Stanford University, United States

Upcoding is the practice whereby medical providers alter claims to receive increased reimbursement. We provide empirical evidence of upcoding at a national scale. We account for unobserved confounders (e.g. patient risk) using state-level variations in adverse event regulation and instrumental variables. We also make several policy recommendations for reducing upcoding.

512 Monday, 09:45 AM - 11:15 AM, Lanai
Session: Behavior and Retailers
Chair(s): Lubin Han
Track: Behavior in Operations Management

065-0361 Reciprocity in Demand Allocation Games
Yinghao Zhang, Assistant Professor, Salisbury University, United States
Tianjun Feng, Associate Professor, Fudan University, China
Lin Tian, Student, Fudan University, China

We consider a situation with two competing retailers who make inventory decisions. The total market demand is divided proportional to their stocking levels. Experimental results suggest that human subjects’ decisions systematically deviate from the Nash Equilibrium. We use theory of reciprocity to explain this off-equilibrium behavior.

065-0757 Consumer Choices in Logistics Services in Online Retailing
Wout Dullaert, Professor, Vrije Universiteit Amsterdam, Netherlands
Bram Foubert, Associate Professor, Maastricht University, Netherlands
Sander De Leeuw, Associate Professor, Vrije Universiteit Amsterdam, Netherlands
Dung Nguyen, Student, Vrije Universiteit Amsterdam, Netherlands

This study examines empirical data on consumer decisions and preferences for logistics services offered by an online retailer in the Netherlands. The results indicate how consumer behavior influences logistics performances of the online retailer.

065-1469 Behavioral Analyses of Duplicated Orders in A Single-Supplier Multi-Retailer Supply Chain
Sebastian Villa, Student, University of Lugano, Switzerland
Paulo Goncalves, Associate Professor, University of Lugano, Switzerland

We experimentally and econometrically analyze the main behavioral characteristics and effects of retailers’ orders in a single-supplier multiple-retailer supply chain. We discuss how different time to build supplier capacity, different levels of competition among retailers and different magnitudes of supply shortage may independently or in combination influence retailers’ order amplification.

065-0208 The Effect of Timeliness of Benefits and Costs on Mobile Coupon Sharing: The Moderating Role of Length of Use in Social Network Sites
Lubin Han, Student, School of Management, China
Xuefeng Zhao, Professor, School of Management, China

Timeliness of benefits and costs have some unusual effects on m-coupon sharing. Length of use was considered as a moderating variable between the relationship of long-term factors and sharing intention. This paper provides a new perspective for retailers and SNSs generating a strategy of mobile marketing and the spreading of eWOMs.

513 Monday, 09:45 AM - 11:15 AM, Veranda
Session: Multichannel Retail Operations
Chair(s): Ozgen Karaer
Track: Retail Operations Management

065-0418 Evaluation of Order Fulfillment Options in Omni-Channel Retail Supply Chain
Rafay Ishfaq, Assistant Professor, Auburn University, United States
Twenty-five large U.S. omnichannel retailers are studied to identify the physical distribution attributes that determine a retailers' choice of omnichannel order fulfillment. Relying on executive interviews and secondary corporate data we create a non-parametric classification-tree analysis framework to evaluate omnichannel retail distribution/fulfillment networks.

065-0425  The Relationship between Consumption Context and Customers' Choice of Delivery Model for Online Orders  
Nima Zaerpour, Student, Vrije Universiteit Amsterdam, Netherlands

We investigate the relationship between consumers' consumption context (e.g. customer location; order value and size; order delivery window, lead time, fees) and customers' choice of delivery model - home delivery vs. click & collect - for orders placed online. These hypotheses are tested based on transactional data of a multichannel grocery retailer.

065-1391  A Fuzzy Clustering Approach to the Capacitated Multi-Depot Location Routing Problem  
Matthias Winkenbach, Lecturer, Research Associate, United States
Eva Ponce-Cueto, Associate Professor, Research Associate, U.S. Minor Outlying Islands
Edgar Blanco, Senior Director Logistics Strategy, Walmart, United States

We present a mixed-integer linear programming model for the multi-fleet, two-echelon capacitated location-routing problem with continuous approximation of optimal routing cost. The model can be used to design a retailer's omni-channel distribution strategy. We apply our model to a real-world case study in the retail fast-fashion industry in Madrid.

065-1731  Retail Channel Management with Product Differentiation  
Gulcin Ugur, Supply chain engineer, Bosch, Turkey
Ozgen Karaer, Assistant Professor, Middle East Technical University, Turkey

We analyze a monopolist retailer's channel management decisions in a product differentiation context. Historically, retailers developed a physical outlet presence after developing their primary brand chain. Here, we evaluate the online channel decisions of a retailer and its interaction with the physical channels available; possibly both primary and outlet chains.

514  Monday, 09:45 AM - 11:15 AM, Rose  
Session: Advances in Inventory Management  
Chair(s): Yinliang Tan

065-1340  Order Crossover and Fill-Rate in Base Stock Policies  
Dean Chatfield, Associate Professor, Old Dominion University, United States
Alan Pritchard, Student, University of Maryland, United States

Order crossover is a prevalent issue for modern supply chains. We utilize a hybrid discrete/continuous simulation model to investigate base-stock inventory systems with fill-rate targets operating under crossover conditions. Issues related to effective lead times, the normal approximation, and the use of the fill-rate performance measures is investigated.

065-0812  Variable-Cost Finite-Production-Rate Model  
Suresh Chand, Professor, Purdue University, United States
Sunantha Prime Teyarachakul, Associate Professor, California State University, United States

We consider the multiple finite-production-rate model, similar to the MP model in Sethi and Chand (1981), with the difference that variable cost increases with the production rate. Assumptions include a single setup and linearly increasing holding costs. We then develop an efficient forward algorithm and forecast-planning horizon.

065-0397  Reducing Inventory Waste: Optimal Order-Up-To Level with Service Level Agreements  
Yinliang Tan, Assistant Professor, Tulane University, United States

Traditional procedures characterizing the order-up-to level satisfying a specified fill rate implicitly assume an infinite performance review horizon. Such a setting leads to deviation between the target and achieved fill rate. We propose and solve this problem over a finite horizon with positive lead time.

515  Monday, 09:45 AM - 11:15 AM, Edelweiss  
Session: New Developments in Vehicle Routing Research (II)  
Chair(s): Lijun Sun

065-0542  Vehicle Routing Problem With All-Time Connectivity Constraints For Operations Of Mobile Ad Hoc Networks  
Sezgin Kaplan, Assistant Professor, Turkish Air Force Academy, Turkey

The Vehicle Routing Problem with All-Time Connectivity Constraints (Connected VRP) has been examined as part of operations of mobile ad hoc networks. A Connected VRP aims to find efficient routes to visit targets by ensuring network connectivity in all time periods. We present a local search algorithm and a mathematical model formulation.

065-0672  A Fuzzy Clustering Approach to the Capacitated Multi-Depot Location Routing Problem  
Henrique Ewbank, Student, Federal University of Rio De Janeiro, Brazil
Peter Wanke, Associate Professor, Federal University of Rio De Janeiro, Brazil

This paper proposes a heuristic approach to the capacitated multi-facility location-routing problem with a homogeneous fleet. This approach applies fuzzy c-means as a clustering technique to get different possible arrangements of customers to each depot and finally solve smaller instances of the capacitated vehicle routing problem.

065-1316  Modeling Load Retrievals in Puzzle-Based Storage Systems  
Masoud Mirzaei, Student, 1979, Netherlands
René De Koster, Professor, Rotterdam School of Management, Netherlands
Nima Zaerpour, Student, Vrije Universiteit Amsterdam, Netherlands
Puzzle-based storage systems allow storage of unit loads in a rack on a very small footprint with individual accessibility of all loads. We develop optimal retrieval models for loads and heuristics for three and more loads. This model can on average save 17% of the move time when compared to individual retrieval.

**516**  
**Monday, 09:45 AM - 11:15 AM, Fuschia**  
**Session:** Business applications of Revenue Management  
**Chair(s):** Jorge Macedo

**065-1128** Revenue Maximization by Integrating Order Acceptance and Stocking Policies  
Tanja Milnar, Assistant Professor, IESEG School of Management, France  
Alejandro Lamas, Assistant Professor, NEOMA Business School, France  
Philippe Chevalier, Professor, Université catholique de Louvain, Belgium

We consider a manufacturer that operates in a combined make-to-order and make-to-stock environment with uncertain demand. Demand differs in unit profits, order sizes, lead times, and frequencies of occurrence. We provide optimal and heuristic acceptance and stock policies to maximize the company's profit.

**065-1273** Pricing and Allocating a Taxi Ride  
Adithya Patil, Student, Indian Institute of Technology Madras, India  
Rahul Marathe, Associate Professor, Indian Institute of Technology Madras, India  
Srinivasan G, Professor, Indian Institute of Technology Madras, India

Taxi-aggregator start-ups across the world face the challenge of capturing markets and maximizing customer patronage with limited resources. This paper presents an MILP model aimed at maximizing the number of customers served while also providing insights into a reverse-auction based dynamic pricing mechanism for assigning taxis to customers.

**065-1901** Pricing and Profit Maximization: A Study on Multiple Products  
Jorge Scarpin, Professor, Federal University of Paraná, Brazil  
Lara Dallabona, Associate Professor, Universidade do Estado de Santa Catarina, Brazil

We demonstrate a pricing method for a large number of products using regression and linear programming. Using a sample of cleaning products from a large Brazilian retailer we model the interaction between products and then optimize prices to achieve maximum profit.

**065-2078** Day-Of-The-Week Price Skimming: The Case of Small Business  
Cicero Duarte, Assistant Professor, Universidade Paulista - Unip, Brazil  
Tonny Rodrigues, Associate Professor, COPPEAD Graduate Business School / Federal University of Rio de Janeiro, Brazil  
José Sacomano, Professor, Universidade Paulista - Unip, Brazil  
Jorge Macedo, Assistant Professor, Universidade Paulista - Unip, Brazil

The aim of this study is to analyze how changes in pricing policies can improve sales for a small business. The results demonstrate how new pricing policies increased sales day-of-the-week of lower sales, as well as increasing sales of the complementary products.

**517**  
**Monday, 09:45 AM - 11:15 AM, Gardenia**  
**Session:** Closed-Loop Supply Chains  
**Chair(s):** Joohyung Kim

**065-1807** The Use of Information Technology and Communication: Workflow System for Greater Integration of Supply Chain  
Arcione Viagi, Assistant Professor, University of Taubaté, Brazil

The global competition has imposed challenges to Supply Chain (SC) integration, mainly during the process of obtaining information to make Demand Management decisions. We show an integrated model for collecting data, analysis, and results dissemination in the SC, contributing to research and alternatives for "The Bullwhip Effect" issue.

**065-0978** Optimal Electric Vehicle Production Strategy Considering Loss Aversion, Subsidies, and Battery Recycling  
Huaying Gu, Student, Huazhong University of Science & Technology, China  
Zhiye LIU, Huazhong University of Science & Technology, China

We extend a previous loss-averse newsvendore model by incorporating both subsidies and battery recycling to investigate how the optimal electric vehicle production strategy is influenced by loss aversion, subsidies, and battery recycling. The analytical solutions for our model are derived, together with numerical experiments evaluating the properties of our model.

**065-1506** Optimal Used-Product Acquisition Pricing  
Gerrit Schumacher, Student, University of Mannheim, Germany  
Moritz Fleischmann, Professor, University of Mannheim, Germany

We consider the pricing decision of a "recommerce" provider buying used electronic equipment from consumers. We model the acquisition process as a sequential game with two-sided incomplete information and derive an optimal quality-dependent acquisition price menu. We also propose an alternative acquisition process, using bonus payments, and discuss its implications.

**065-1481** The Challenges and Opportunities for Improving the Supply of Recycle Glass  
Amelia Carr, Professor, Bowling Green State University, United States  
Joohyung Kim, Joohyung Kim

We present a model that balances drivers' workload with the traditional model of vehicle routing problem. We propose a multi-objective optimization model of petrol distribution that can generate a distribution plan that optimizes the total distribution cost and drivers' workload.
The need for recycled glass exceeds the demand in many markets. More emphasis is needed on the recycling of glass to offset the demand for raw material inputs for making glass and to decrease the amount of glass sent to landfills. We examine the opportunities for access in this market.

**065-0579**  
**Title:** Do they match? Assessing sustainability reporting from stakeholders’ interest perspective vs. GRI requirements  
**Authors:** Marina Matta, Associate Professor, Universidad Europea, Spain  
Henry Aigbedo, Associate Professor, Oakland University, United States  
Ivan Hilliard, Assistant Professor, Universidad Europea, Spain  
Andriy shapoval, Student, Georgia Institute of Technology, United States  
**Abstract:** In recent years, standards and initiatives towards homogenizing corporate reporting on sustainability, such as Global Reporting Initiative (GRI) have increased in number and use. However, it has not yet been assessed whether these reports incorporate all the variables stakeholders value. This study evaluates this matter in the aerospace industry.

**065-1360**  
**Title:** Corporate Sustainability Strategy Implementation and Disclosure: An Analysis of Global Fortune 500 Reports  
**Authors:** Marco Formentini, Lecturer, University of Bath, United Kingdom  
Kannan Govindan, Professor, University of Southern Denmark, Denmark  
Martine Riblan, Student, Universita' della Valle d'Aosta, Italy  
Paolo Tatich, Lecturer, Imperial College London, United Kingdom  
**Abstract:** We investigate what governance mechanisms are used by Global Fortune 500 companies for implementing corporate sustainability strategies at the supply-chain level and how they are disclosed. We coded 100 GF500 sustainability reports to classify governance mechanisms in terms of Triple-Bottom-Line approach, supply-chain extension, collaboration and formalization, and discuss disclosure approaches.

**065-1637**  
**Title:** Sustainability’s Sisyphus Effect: How Customer Service Quality Affects the Perceptions of Sustainability Initiatives  
**Authors:** Stanley Fawcett, Professor, Weber State University, United States  
Sebastian Brockhaus, Assistant Professor, Weber State University, United States  
Amydeean Fawcett, Assistant Professor, Weber State University, United States  
A. Knemeyer, Associate Professor, Ohio State University, United States  
**Abstract:** Companies engage in sustainability to enhance their brand image. We examine how service quality influences customer perceptions of sustainability. We find that positive service perceptions reinforce and amplify customers’ sustainability attributions. This helps us understand how consumers judge sustainability efforts using Availability and Affect Heuristics and Social Judgment Theory.

**065-1904**  
**Title:** Measuring and Understanding Consumer Responses to Corporate Social Responsibility Supply Chain Practices  
**Authors:** Mahesh Srinivasan, Associate Professor, University of Akron, United States  
**Abstract:** This research examines the impact of Corporate Social Responsibility (CSR) supply chain practices has on consumers’ preferences and choices. The central research question is the willingness of consumers to pay for “green” supply chain practices.

**065-1277**  
**Title:** Impact of Integrated Marketing on NPD: An Investigation of the Jordanian Manufacturing Sector  
**Authors:** Ahmed Alamro, Assistant Professor, Qatar University, Qatar  
**Abstract:** We identify the impact of integrated marketing on NPD in the Jordanian manufacturing sector. The importance of this study stems from a scientific analysis of correlation between integrated marketing and NPD, and the application of the results to companies.

**065-1777**  
**Title:** Impact of Media Substitution and Synergy in Media Planning Decisions for a New Product Introduction  
**Authors:** Vahideh Abedi, Assistant Professor, California State University Fullerton, United States  
Oded Berman, Professor, University of Toronto, Canada  
Dmitry Krass, Professor, University of Toronto, Canada  
**Abstract:** Substitutive and synergic interactions between multiple marketing media can significantly influence marketing strategies of firms. However, existing literature focuses on only one of these interactions, at the expense of the other. We show that both of these interactions most typically exist and study their impact on firm’s media planning strategies.

**065-0790**  
**Title:** Determining the Value of Operations Flexibility  
**Authors:** Timothy Smunt, Professor, University of Wisconsin Milwaukee, United States  
Stephen Lawrence, Associate Professor, University of Colorado Boulder, United States  
**Abstract:** We examine the selection of operations technologies over a planning horizon when there is a potential change in market preferences for more or less product variety. Using a Markov Decision Process model, we consider both “robust” and “flexible” policies.

**065-1894**  
**Title:** How New IT Trends Are Being Accepted in P / OM  
**Authors:** Marcelo Okano, Professor, CEETEFS, Brazil  
Marcelo Fernandez, Professor, Centro Estadual de Educacao Tecnologica Paula Souza, Brazil  
Oduvaldo Vendrametto, Professor, Universidade Paulista - Unip, Brazil  
**Abstract:**
New technologies of information are changing corporate environments in order to break the paradigms of physical barriers. An example is cloud computing where the software and hardware are virtual. We present a survey of 30 companies regarding the new trends and how to adapt them.

Supply chains are susceptible to cyberattacks more than ever. Our work focuses on the downside of attacks contaminating the building blocks of supply chain infrastructure. We develop a game theoretic model wherein retailers compete to serve markets and we identify the supply chain network and individual retailer vulnerability to cyberattacks.

We propose and test two frameworks to explain the moderate effect of Lean product development on the impact of Lean shop floor practices on quality and inventory, using data from 110 plants. Results indicate that there is a moderating effect on quality, but not for inventory.

There is a need to better understand the role of leadership on Lean production. We propose a framework to explain the effect of Lean leadership competencies, leadership development practices, and Lean shop floor practices on operational performance. The model was tested using data from a survey with 93 respondents.

We investigate the relationship between quality management practices and operational performance in Vietnamese manufacturing companies. Based on the data collected from 25 Vietnamese manufacturers in 2014, this study indicates significant impacts of quality management practices on quality, speed of delivery, and flexibility, but not on cost reduction.

One aspect of lean manufacturing is identifying waste in the industrial process by reducing flow time (the amount of time a unit spends in process). We demonstrate a methodology for tracking industry flow time for U.S. manufactured goods.
We propose two frameworks to explain the moderating effect of supplier and customer integration on the impact of Lean shop floor practices on Inventory and Quality. Models were tested through OLS regression using data from an empirical survey of 119 plants.

**065-0277 The Effects of Machine Maintenance in Productivity of a Disposable Cup Industry**

Cicero Duarte, Assistant Professor, Universidade Paulista - Unip, Brazil
Tonny Rodrigues, Associate Professor, COPPEAD Graduate Business School / Federal University of Rio de Janeiro, Brazil
José Sacomano, Professor, Universidade Paulista - Unip, Brazil
Jaqueline Barduzzi, Student, Universidade Nove De Julho, Brazil

Our research aims to increase the productivity of a disposable cup industry through machine maintenance. Our main findings reduce setup time and the amount of downtime, and increase the speed of cup production machines.

**065-0492 Innovation in Engineer Graduation**

Danielle Miquilim, Student, Universidade Paulista - Unip, Brazil
Marcia Terra da Silva, Professor, Universidade Paulista - Unip, Brazil

We show the key factors of innovative teaching in engineering graduation, utilizing as method a systematic bibliography revision through the Web of Science platform. The researched articles quote as factors: flexible and interdisciplinary curriculum, use of pedagogical methodologies oriented towards student, and learning processes.

**065-0863 Technological Development and the Perception of Interactivity for Distance Education**

Esdras Barbosa, Student, Universidade Paulista - Unip, Brazil
Maria Terra da Silva, Professor, Universidade Paulista - Unip, Brazil

Due to technology development, interactivity in distance education is now feasible; yet the literature indicates it scarcely occurs in such courses. We evaluate students’ and teachers’ perceptions of interactivity. Accordingly, a questionnaire was constructed using a frame of teaching interaction and tested on ongoing courses.

**065-1458 Opportunities and Challenges of an Interdisciplinary Minor**

Robert Burgess, Senior Lecturer, Georgia Institute of Technology, United States

Ravi Subramanian, Associate Professor, Georgia Institute of Technology, United States

Companies need engineers who understand market forces and the financial implications of technology investments, as well as managers who understand the technical aspects of new process and product development, and the capabilities and constraints of technologies. We discuss opportunities and challenges of a Minor designed to accomplish these goals.

**065-0087 New Product Development: Impact of Development Tools on Internal and External Collaboration and Performance**

Debasish Mallick, Associate Professor, University of St. Thomas, United States

A large number of development tools have emerged to facilitate the new product development. This study examines the role of internal coordination capability and external collaboration capability as the two possible intervening variables connecting six types of popular development tool usage and NPD outcomes using a sample of 453 firms.

**065-1197 PMO (Project Management Office) Integration into Organizations: A Large Brazilian Company Case**

Orlando Cattni Junior, Associate Professor, Fundacao Getulio Vargas, Brazil
Thiago Henriques, Student, Eaeep - Fgv, Brazil
We present a qualitative survey of findings and discrepancies between theory and practice in structuring a project management office (PMO). We carried out a comparison between what is recommended in the literature and the results of a survey conducted with managers and directors of a large Brazilian company.

065-1930 The Relationship of Innovation Climate, Knowledge Ambidexterity and Service Innovation Performance
ruizhang, Associate Professor, Mcmaster University, Canada

The innovation climate and innovation ability are closely related. We focus on how innovation climate affects innovation performance. Based on a literature review, a theoretical hypothesis is presented and tested by case analysis. By interview and questionnaire survey, we reveal the nature of the research topic and propose a theoretical framework.

525 Monday, 09:45 AM - 11:15 AM, Poinsettia
Session: Case studies in emerging economies
Chair(s): Fabricio Piacente

Track: Economic Models in Operations Management

065-0816 Brazilian Railways: An Efficiency Analysis of the Operations Using DEA in Two Stages
Dalmo Marchetti, Student, Federal University of Rio De Janeiro, Brazil
Peter Wanke, Associate Professor, Federal University of Rio De Janeiro, Brazil

We study the efficiency of Brazilian railways during the period from 2010 to 2014, a period of regulatory changes. We use data envelopment analysis, a slack-based model, and bootstrap truncated regression to analyze the impact of selected exogenous variables on the efficiency of DMU's.

065-1601 Factors Influencing the Volatility of Passengers and Cargo Airlines in Brazil From 2000 to 2015
Claudio Miotto, Associate Professor, Federal University of Uberlandia, Brazil
João Guerra, Professor, Federal University of Uberlandia, Brazil
Michelle Carrijo, Professor, Federal University of Uberlandia, Brazil
Kleber Pinto, Associate Professor, Federal University of Uberlandia, Brazil

A country's airline industry is of great strategic importance. We investigate, through a multiple-case study, the endogenous and exogenous factors that impact Brazilian airlines' volatility between 2000 and 2015. We show that there is significant sensitivity between the performances of the companies, their strategies, and their economic environments.

065-1127 Market Share in Brazil: a Case Study of the Food and Beverage Industry
Fabricio Piacente, Professor, Centro Estadual de Educação Tecnológica Paula Souza, Brazil
Vanessa Silva, Professor, Centro Estadual de Educação Tecnológica Paula Souza, Brazil
Pâmela Moretti, Student, Centro Universitário Padre Anchieta, Brazil
Denys Biaggi, Professor, Centro Estadual de Educação Tecnológica Paula Souza, Brazil

This study evaluates concentration levels in the food and beverage industry, calculating and analyzing Concentration Ratio indicators and the Hirschman-Herfindahl Index. We examine growth in these indicators between 1996 and 2013 in order to confirm this concentration pattern.

526 Monday, 09:45 AM - 11:15 AM, Quince
Session: Miscellaneous Topics in Teaching and/or Assessment
Chair(s): Marcelo Okano Dana Johnson

Track: Teaching/Pedagogy in P/OM

065-0356 Quality and strategy in Brazilian Higher Education Institutions (HEI): a performance indicators strategy
Tonny Rodrigues, Associate Professor, COPPEAD Graduate Business School / Federal University of Rio de Janeiro, Brazil
Átila Lira, Associate Professor, Universidade Paulista - Unip, Brazil
Irenilza Nääs, Professor, Universidade Paulista - Unip, Brazil

This research analyse the relationship between quality and strategy in the HEI using performance indicators. The results show that strategies focused on quality are positively related to other competitive strategies adopted by HEI and the performance indicators are integrated tools of strategic management to achieve quality in the HEI.

065-1979 Sustainability in Higher Education: A New Mental Model Definition
Etienne Abdala, Assistant Professor, Federal University of Uberlândia, Brazil
Luciana Cezarino, Student, Federal University of Uberlandia, Brazil
Vivian Fernandes, Assistant Professor, Federal University of Uberlândia, Brazil
Michelle Carrijo, Professor, Federal University of Uberlândia, Brazil
Mara Soares, Student, Federal University of Uberlandia, Brazil

The sustainability teaching process in higher education is not very recent in Brazil. This paper aims to know how graduate business professors view sustainable higher education in Brazil. A focus group with professors at a Federal University was done and the results indicate a new education model.

065-0184 Factors That Impact College Cheating
Albena Ivanova, Associate Professor, Robert Morris University, United States
Connie Ruzich, Emeritus Professor, Robert Morris University, United States

This study summarizes the factors that impact college cheating and provides recommendations for faculty to reduce the probability of cheating.

065-0282 Accreditation Standards Integrated with Academic Unit Operations/Strategy
Dana Johnson, Professor, Michigan Technological University, United States

Business schools should view accreditation as a check on process quality similar to other certification and registration standards. The 2013 AACSB can serve as a basis for strategic integration and performance measurement. A theoretical framework is presented to serve as the basis for future information gathering and data analytics.

065-1892 Teaching P/OM Using Entrepreneurship and Innovation Techniques as a way to Incentivize and Search for Students
Marcelo Okano, Professor, CEETEPS, Brazil
Monday, 09:45 AM - 11:15 AM

Oduvaldo Vendrametto, Professor, Universidade Paulista - Unip, Brazil
Marcelo Fernandes, Professor, Centro Estadual de Educacao Tecnologica Paula Souza, Brazil
Osmildo Santos, Professor, Universidade Potiguar, Brazil

In P/OM courses, there is a need for research mainly linked to the labor market. The big challenge is how to bring in the professional market that is closest to the student. This paper details our experience in using entrepreneurship and technological innovation as a way to search for and incentivize the students.

527  Monday, 09:45 AM - 11:15 AM, Azalea
Session: Risk Management Approaches
Chair(s): Sabine Baumann
065-0065 Business Continuity: Securing the Supply Network Using an Integrated Map-Based Risk Management Solution
Tobias Engel, Professor, University of Applied Science Neu-Ulm, Germany
Thomas Bella, Senior Manager, Mieschke, Hofmann und Partner, Germany

Our implemented supply chain risk management solution at a Top10 Tier1 supplier in the automotive industry uses a map-based approach to visualize risks throughout the network. The integrated solution allows firms to create and import own risk clusters for proactively managing risks and simulating scenarios in case of risk occurrence.

065-1022 Preparing for Network Failures: Risk Assessment and Management in Value Creation Architectures
Sabine Baumann, Professor, Jade Hochschule, Germany
Oliver Eulenstein, Professor, Iowa State University, United States
Christoph Wunck, Professor, Jade Hochschule, Germany

Value creation architectures bear considerable risks if critical partners default on their functions. We apply novel algorithms to generate robust and cost-effective architectures for given settings (order, timeline, organizational units, costs constraints, etc.) while identifying critical components, assessing risks for the network, and determining emergency designs for contingency planning.

065-2019 Assessment of Risk in the Supply Chain Management in Nigeria Oil Industry
Olatunde Aroge, Student, University of Bradford, United Kingdom
M Reza Abdi, Assistant Professor, Bradford University, United Kingdom

We explore Failure Mode and Effective Analysis to identify the critical oil risk and evaluate the impacts of these risks on supply chain management. This study creates a definitive structural framework for guiding supply chain practitioners and academics on the assessment of supply chain risk management in Nigeria.

065-2050 Making supply chain financing decisions by leveraging risks and costs
Xiao Song, Student, South China University of Technology, China
Qiuqiang Huang, Student, School of Business Administration, China
KwanHo Yeung, Student, School of Business Administration, China
Xande Zhao, Professor, China Europe International Business School, China

This study will investigate the effects of SCI by SCF organizers (for both informational and physical aspects) on coordination and risk evaluation costs, and on customer satisfaction and demand level. We make a case-comparison between identification of transaction structures and the controlling of closed loop transactions.

528  Monday, 09:45 AM - 11:15 AM, Begonia
Session: Data Driven Logistics and Supply Chain Management
Chair(s): Abdollah Noorizadeh
065-0758 Exploratory Study of Brazilian Cargo Carriers
José Campanele, Assistant Professor, IFSP, Brazil
Getulio Akabane, Retired, CEETEPS, Brazil
Joao Santos, Student, Universidade Adventista De Sao Paulo, Brazil
Adriano Silva, Professor, IFSP, Brazil

This study uses 250 structured questionnaires to study strategic planning creation, development, and implementation among Brazilian Cargo Carriers, and finds that regardless of the sector, type, or organization size, some of the organizations end up going astray.

065-1369 A New Approach for Supplier Performance Evaluation
Abdollah Noorizadeh, Student, Aalto University, Finland
Abolfazl Keshvari, Lecturer, Aalto University, Finland
Antti Peltokorpi, Assistant Professor, Aalto University, Finland

Data envelopment analysis (DEA) is a popular method for supplier selection (SS). However, in using DEA for SS, there is no much attention paid to separate inefficiency in operational and managerial activities from statistical data noise. As a first study, we apply the stochastic non-parametric envelopment of data (StoNED) technique to solve this problem.

065-1539 Big Data Analytics for Supply Chain Management
Zenon Michaelides, Lecturer, MANAGEMENT SCHOOL, United Kingdom

Big data has been cited as “the next frontier for innovation, competition, and productivity” (MGI, 2011). However, recent research by MIT Sloan Institute/SAS Institute (2014) identifies the role of analytics as a “common path” rather than a “new path” to value, suggesting more widespread adaptation but less first-mover advantage.

529  Monday, 09:45 AM - 11:15 AM, Camelia
Session: Environmental Strategies and Innovations in Supply Chain Management
Chair(s): Shawn Bhimani
065-1462 Environmental Operations Management
Xiande Zhao, Professor, China Europe International Business School, China
KwanHo Yeung, Student, School of Business Administration, China
Qiuping Huang, Student, School of Business Administration, China
Xiao Song, Student, South China University of Technology, China

We identify Failure in Oil management. Effective on explore risks of impacts of these risks for SCF management. We explore researchers on supply chain practitioners and academics on the assessment of supply chain risk management in Nigeria.
Incorporating sustainability into organizational systems requires a lot of organizational learning (Sarkis, 2010; Siebenhüner and Arnold, 2007). In this light, organizational learning plays a major role in ensuring firm's transition to a sustainable corporation. We addresses issues of sustainability-related learning, with regard to knowledge acquisition and dissemination.

We explore current human trafficking prevention schemes by modeling the interaction between a regulator and a business. By analyzing the incentive systems at play, we provide insights on how to effectively motivate integral stakeholders in the fight against corrupted supply chains.

Given the increased importance of environmental strategy in business, we posit that firms utilize environmental innovations as strategic instruments for gaining competitive edge over others. We examine the dynamic interaction between rival and focal firm environmental innovations and investigate how partner firms moderate dynamic rivalry interactions.

We consider the situation where independent operators of queueing systems cooperate to generate a win-win solution through capacity transferring among each other. Specifically, we first propose an algorithm to solve the capacity transferring problem with transferring cost. Then we design stable and fair cost allocation rules to split total cost.

For some time, customers, patients and clients have suffered through excessive waiting, even with appointment based systems. Customers expect waiting as inevitable and servers fail to be concerned. Our research provides a method to evaluate queueing systems and test alternative strategies to demonstrate the "optimal wait is no wait".

We analyze a shopping center operations management process from improvements in customer flow management. Our results point to two key solutions that impact the operations management: a) the implementation of guidance displays from the shops map organization; and b) the parking spaces management system.

The present study uses Automatic Vehicle Location (AVL) data in a rural transportation system to improve schedule adherence, and running time adherence. We analyze the effects of discussing the data with management and propose changes to the schedule in order to improve performance reliability.
By pioneering the delivery of information technology (IT)-enabled public services, the Indian state of Andhra Pradesh has improved their speed and accessibility, resulting in higher citizen satisfaction and productivity which are not reflected in the GDP. We suggest some methods to measure the impact of IT-enabled public services on GDP.

065-0945  A Game-Theoretic Analysis of a New Type of Delivery Service: AmazonFresh vs. Instacart
Ling-Chieh Kung, National Taiwan University, Taiwan, Republic of China

We present a game-theoretic model to discuss the competition between the two types of delivery: shipping from a self-owned warehouse or from an independent retail store. AmazonFresh and Instacart are two major examples. We identify concrete conditions under which the second model is sustainable in a market.

065-1365  Understanding Experts and Regular Customer Value in Technology-Enabled Services
Min Kyung Lee, Student, Clemson University, United States
Rohit Verma, Emeritus Professor, Cornell University, United States
Aleda Roth, Emeritus Professor, Clemson University, United States

Technology can improve the quality of service delivery. Our research develops a numerical taxonomy of experts and regular customers in terms of their value, using technologies in the U.S. restaurant industry. Our study offers insights for service strategy technology choices and customer value.

065-1300  A New Method to Evaluate the Damage Degree and Forecast the Demand of the Disaster Areas
Buhao Li, Student, Huazhong University of Science & Technology, China
Haijun Wang, Professor, Huazhong University of Science & Technology, China

We conduct a new method that clusters multiple sources of data about the disaster areas, to evaluate damage degree in disaster areas. Taking the damage degree of different disaster areas and the amount of total relief materials into consideration, we estimate the demand of disaster areas.

Leonardo Varella, Student, Federal University of Santa Catarina, Brazil
Mirian Gonçalves, Assistant Professor, Federal University of Santa Catarina, Brazil

Donation Management is an important and relevant aspect in humanitarian operations. We present collaboration as the most critical factor in efficient donations management, asserting strategies that might improve its relevance in such scenarios, proposing an operations reference model and simulation as important tools to achieve better results.

065-1004  From Chaos to Strategy: Donations Management in the Humanitarian Operations
Leonardo Varella, Student, Federal University of Santa Catarina, Brazil
Mirian Gonçalves, Assistant Professor, Federal University of Santa Catarina, Brazil

Donation management is an important and relevant aspect in humanitarian aid and rescue operations. However, little has been discussed on the subject, especially in Brazil. We present critical factors which contribute to a more efficient donations management within humanitarian logistics and propose strategies for donations management.

065-0206  Damage Assessment Approaches in Disaster Operations: An Exploratory Study
HAMENDRA Dangi, Associate Professor, Delhi School of Economics, University of Delhi, Delhi, India
Ritu Sapra, Associate Professor, Delhi School of Economics, University of Delhi, Delhi, India

Disaster are causing a widespread loss of human lives and property. The existing approaches of damage assessment in developing countries are ad hoc in nature. An exploratory study was conducted. The results indicate that a formal approach of damage assessment is required.
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Track</th>
<th>Chair(s)</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
| Monday, 11:30 AM - 01:00 PM | Track: Humanitarian Operations and Crisis Management  
Session: Humanitarian Coordination and Performance Measurement  
Chair(s): Gloria Urrea | 541                                        | 065-1984  
An Institutional Theory Approach to Exploring Humanitarian Logistics Operations Performance  
Luis Lopez, Professor, INCAE, Costa Rica  
Andrea Prado, Assistant Professor, INCAE, Costa Rica  
Roy Zuniga, Professor, INCAE, Costa Rica | We use data from an impoverished area to study how institutions impact the last mile of a humanitarian operation. Results show configurations of institutional factors affecting performance and creating incentives that may lead to opportunism. We reveal humanitarian operations' ways to succeed within a mesh of institutional factors. |
| Monday, 11:30 AM - 01:00 PM | Track: Supply Chain Management  
Session: Managing Products and Relationships in the Supply Chain  
Chair(s): Daniel Bumblauskas | 542                                        | 065-0338  
Optimal Replenishment Cycle for Perishable Items under Demand Uncertainty  
Merve Kirci, Student, Ecole Polytechnique Fédérale de Lausanne, Switzerland  
Isik Bicer, Student, Ecole Polytechnique Fédérale de Lausanne, Switzerland  
Ralf Seifert, Professor, Ecole Polytechnique Fédérale de Lausanne, Switzerland | We consider a food supply chain with an upstream manufacturer and a downstream retailer. The manufacturer processes raw materials into finished products that the retailer purchases in each replenishment cycle. We show that short raw material lifetime, high demand volatility and suboptimal replenishment cycles increase costs for both parties. |
| Monday, 11:30 AM - 01:00 PM | Track: Healthcare Operations Management  
Session: Predictive Modeling and Forecasting of Healthcare Demand  
Chair(s): Luyi Yang | 546                                        | 065-1925  
Short-Term Inpatient Bed Prediction  
Smriti Neogi, PhD, Senior Analyst, Cincinnati Children's Hospital, United States  
Michael Platt, Senior Analyst, Cincinnati Children's Hospital, United States  
Denise White, Assistant Professor/Director QI Analytics, Cincinnati Children's Hospital Medical Center, United States | We present a useful method for predicting daily inpatient bed needs, which models separately various admission and discharge sources, using historical lengths of stay, occupancy, and seasonality to translate future activity into bed need. The prediction accuracy is measured by comparing actual and predicted values of the forecast each day. |
| Monday, 11:30 AM - 01:00 PM | Track: Supply Chain Management  
Session: Managing Products and Relationships in the Supply Chain  
Chair(s): Daniel Bumblauskas | 542                                        | 065-1547  
Relational and Structural Embeddedness in Customer Network and Supplier’s Financial Performance  
Yoon Hee Kim, Assistant Professor, Georgia Southern University, United States | Network researchers have argued that both relational embeddedness - characteristics of relationships - and structural embeddedness - characteristics of the relational structure - influence a firm’s behavior and performance. We explore how a supplier's financial performance is affected by the relational and structural characteristics of its major customer network. |
| Monday, 11:30 AM - 01:00 PM | Track: Supply Chain Management  
Session: Managing Products and Relationships in the Supply Chain  
Chair(s): Daniel Bumblauskas | 542                                        | 065-1569  
Specialty Coffee: A Demand Guided Supply Chain  
Jose Carvalho, Associate Professor, UnB, Brazil  
Carlos Pena, Associate Professor, The University of Brasilia, Brazil  
Daniel Bumblauskas, Assistant Professor, The University of Northern Iowa, United States  
Patricia Guarnieri, Lecturer, Universidade de Brasilia, Brazil | Case studies of high quality coffee shops and their suppliers offer an efficient example of a demand guided supply chain. These organizations are capable of decoding information from their clients and an extensive community of practice in order to occupy the niches of the high quality coffee market. |
| Monday, 11:30 AM - 01:00 PM | Track: Healthcare Operations Management  
Session: Predictive Modeling and Forecasting of Healthcare Demand  
Chair(s): Luyi Yang | 546                                        | 065-1241  
Emergency Department Forecasting in a Hospital: A Hybrid Model Between the Box-Jenkins and ANN Methods  
João Chang Junior, Associate Professor, Campus Sao Bernardo do Campo, Brazil  
Nayara Rosa, Student, Campus Sao Bernardo do Campo, Brazil | We present a useful method for predicting daily inpatient bed needs, which models separately various admission and discharge sources, using historical lengths of stay, occupancy, and seasonality to translate future activity into bed need. The prediction accuracy is measured by comparing actual and predicted values of the forecast each day. |
This article aims to compare the effectiveness of Box-Jenkins with Artificial Neural Networks to obtain a more accurate forecast of patient admission in the emergency department of a cardiopulmonary public hospital. We use a database with 1,095 daily observations of patients admitted to the emergency department from 2009-2011.

<table>
<thead>
<tr>
<th>Session: Job Shop Scheduling and Related Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair(s): Ramakrishna Govindu</td>
</tr>
<tr>
<td><strong>065-0940</strong> Benefits of Having Healthcare Social Networking Sites: A Signaling Perspective</td>
</tr>
<tr>
<td>Ling-Chieh Kung, National Taiwan University, Taiwan, Republic of China</td>
</tr>
<tr>
<td>We construct a game-theoretic model to examine possible factors affecting a healthcare provider's willingness to join a healthcare social networking site and voluntarily share information on it. We demonstrate how hidden quality, public reputation, and operation mode (for-profit or non-profit) influence a healthcare provider's participation decisions.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session: Revenue management and Pricing with Financial Concerns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair(s): Yunyi Zhang</td>
</tr>
<tr>
<td><strong>065-0973</strong> Benchmarking Pricing Decisions</td>
</tr>
<tr>
<td>David Collier, Professor, Florida Gulf Coast University, United States</td>
</tr>
<tr>
<td>Timothy baker, Associate Professor, Washington State University, Tri-Cities, United States</td>
</tr>
<tr>
<td>We investigate what drives consistent pricing decisions and financial performance and introduce a new benchmarking metric. A total of 385 complete surveys were used in the data analysis. A price adherence metric and structural equation modeling was used to evaluate performance relationships.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session: Revenue management and Pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair(s): Yunyi Zhang</td>
</tr>
<tr>
<td><strong>065-1376</strong> Network Formation in Coalition Loyalty Programs</td>
</tr>
<tr>
<td>Arpit Goel, Student, Stanford University, United States</td>
</tr>
<tr>
<td>Ashish Goel, Professor, Stanford University, United States</td>
</tr>
<tr>
<td>Coalition loyalty programs are agreements between merchants allowing their customers to exchange reward points from one merchant to another at predetermined exchange rates, introducing debt between merchants for offloading each other's liabilities. We model the network formation of coalition programs as a Stackelberg game and characterize emerging equilibria.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session: Scheduling and Logistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair(s): Ramakrishna Govindu</td>
</tr>
<tr>
<td><strong>065-2001</strong> New Active Schedulers for Job Shop Scheduling Problems</td>
</tr>
<tr>
<td>Mehdi Behroozi, Student, University of Southern California, United States</td>
</tr>
<tr>
<td>kourosh esghi, Professor, Sharif University of Technology, Iran (Islamic Republic of)</td>
</tr>
<tr>
<td>We present two different algorithms for generating active schedules for Job Shop Scheduling Problem. The first is a GRASP algorithm and the second is an exact algorithm. The exact algorithm can enumerate all active solutions and be applied to a wider spectrum of problems than the venerated Giffler and Thompson algorithm.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session: Scheduling and Logistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair(s): Ramakrishna Govindu</td>
</tr>
<tr>
<td><strong>065-1951</strong> Investigating Automatic Feature Learning for the Job-Shop Scheduling Problem</td>
</tr>
<tr>
<td>Sadegh Mirshekarian, Student, Ohio University, United States</td>
</tr>
<tr>
<td>We investigate the possibility and potential of using automatic feature learning techniques, like deep neural networks, to extract better features and a better combination of hand-engineered features, for the Job Shop Scheduling Problem. The results are promising and indicate there is possibility of significant improvements in the field.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session: Scheduling and Logistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair(s): Ramakrishna Govindu</td>
</tr>
<tr>
<td><strong>065-068</strong> Complex Job Shop Scheduling in Manufacturing and Services: Narrowing the Gap between Theory and Practice</td>
</tr>
<tr>
<td>Reinhard Bürgy, Student, 1979, Canada</td>
</tr>
<tr>
<td>We address a job shop scheduling problem that includes a wide variety of features (such as limited storage capacity, time lags, setups) with a quite general objective. We give a disjunctive graph formulation and develop a local search based on job insertion. Numerical results support the validity of our approach.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session: Scheduling and Logistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair(s): Ramakrishna Govindu</td>
</tr>
<tr>
<td><strong>065-1475</strong> New Heuristics for Lot Streaming in Flowshop Scheduling</td>
</tr>
<tr>
<td>Ramakrishna Govindu, Lecturer, University of South Florida, United States</td>
</tr>
<tr>
<td>Anurag Agarwal, Professor, University of South Florida, United States</td>
</tr>
<tr>
<td>We propose new heuristics for the lot-streaming scheduling problem within the flowshop environment. We consider transfer times, sequence dependent lot setup times, as well as sublist setup times are also we attempt to find the optimal sublot size that minimizes the makespan.</td>
</tr>
</tbody>
</table>

**Monday, 11:30 AM - 01:00 PM**

**065-0940** Benefits of Having Healthcare Social Networking Sites: A Signaling Perspective

**065-0845** Patient Choice Matters: Searching for Better Quality and a Shorter Queue

**065-1951** Investigating Automatic Feature Learning for the Job-Shop Scheduling Problem

**065-068** Complex Job Shop Scheduling in Manufacturing and Services: Narrowing the Gap between Theory and Practice

**065-1475** New Heuristics for Lot Streaming in Flowshop Scheduling

**065-0973** Benchmarking Pricing Decisions

**065-0976** Pricing European and American Options of Real Estate Index

**065-1376** Network Formation in Coalition Loyalty Programs

---

Chair(s): Ramakrishna Govindu

Session: Job Shop Scheduling and Related Problems

Track: Scheduling and Logistics

Chair(s): Ramakrishna Govindu

Session: Revenue management and Pricing with Financial Concerns

Track: Revenue Management and Pricing

Chair(s): Yunyi Zhang

Session: Revenue management and Pricing

Track: Revenue Management and Pricing

Chair(s): Yunyi Zhang

Session: Scheduling and Logistics

Track: Scheduling and Logistics

Chair(s): Ramakrishna Govindu

Session: Scheduling and Logistics

Chair(s): Ramakrishna Govindu

Session: Scheduling and Logistics

Track: Scheduling and Logistics

Chair(s): Ramakrishna Govindu

Session: Scheduling and Logistics

Chair(s): Ramakrishna Govindu

Session: Scheduling and Logistics

Chair(s): Ramakrishna Govindu

Session: Scheduling and Logistics

Chair(s): Ramakrishna Govindu

Session: Scheduling and Logistics

Chair(s): Ramakrishna Govindu

Session: Scheduling and Logistics

Chair(s): Ramakrishna Govindu
<table>
<thead>
<tr>
<th>Session</th>
<th>Track: Information in Operations Management</th>
<th>Chair(s): Lin Hao</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-0854</td>
<td>Impact of Digital Embeddedness on Organizational Purchase Behaviors</td>
<td>Haris Kriestorac, Student, University of Texas Austin, United States, Rajiv Garg, Assistant Professor, University of Texas Austin, United States</td>
</tr>
<tr>
<td>065-2030</td>
<td>An Empirical Analysis of the Effect of Jump Bidding in Overlapping Online Auctions</td>
<td>Lin Hao, Assistant Professor, University of Notre Dame, United States, Yong Tan, Professor, University of Washington, United States, Arvind Tripathi, Associate Professor, University of Auckland, New Zealand</td>
</tr>
<tr>
<td>065-2035</td>
<td>Understanding user evaluation of Information Quality Dimensions in a digitized world</td>
<td>Sanjay Kumar, Professor, Management Development Institute, India, Meenakshi Jakhar, Student, Management Development Institute, India</td>
</tr>
<tr>
<td>065-1532</td>
<td>Logistics Analysis in Oil Exploration Activities Based on Project Management and System Dynamics Approaches</td>
<td>Melkyn Ricardo Saavedra Marroquin, Student, Federal University of Bahia, Brazil, Cristiano Hora de Oliveira Fontes, Leonardo González, Professor, Universidad De La Sabana, Colombia, Francisco Freires, Associate Professor, Universidade Federal da Bahia, Brazil</td>
</tr>
<tr>
<td>065-2018</td>
<td>Introducing the Internet of Things in the German Manufacturing Industry</td>
<td>Julian Müller, Student, University of Erlanger-Nuremberg, Germany, Kai-Ingo Voigt, Professor, Friedrich-Alexander Universitat Erlangen-Nurnberg, Germany</td>
</tr>
<tr>
<td>065-1783</td>
<td>Industry Operations Modeling: Identifying Areas of High Resource Consumption in U.S. Manufacturing</td>
<td>Douglas Thomas, Economist, National Institute of Standards and Technology, United States, Anand Kandaswamy, Economist, National Institute of Standards and Technology, United States</td>
</tr>
<tr>
<td>065-0689</td>
<td>Strategic Technology and Business Alignment: A Case Study in a Credit Bureau</td>
<td>Renata Oliveira, Student, CEETEPS, Brazil</td>
</tr>
</tbody>
</table>

Monday, 11:30 AM - 01:00 PM
The present research seeks a degree of alignment between IT and business through qualitative case studies under Audy and Brodbeck's model (2003). The convenience data gathering through structured questionnaire interviews with organization executives in different areas, demonstrated degree of adherence of solutions implemented among business and IT strategies.

**065-1405** Impact of New Product Development Strategy on Firm Sustainability Performance: A System Dynamics Approach
Ajaia Swain, Assistant Professor, St. Mary's University, United States

We propose a system dynamics model to analyze the impact of new product development strategy on firm competition and firm sustainability performance. Specifically, we investigate whether failure of new product development strategy is attributed to the delay in its adaptation to the business model, infrastructure, and resources of the firm.

**065-1499** How Do Hierarchical Institutions Suffocate Emerging Markets?
Ari Vepsalainen, Professor, Aalto University, Finland

Institutions, especially hierarchical organizations, resist change. Typical corporate initiatives suffocate any market-type activities. We identify a three-level concurrent solution: Open protocols for process alignment, integral technology replacing managers, and specialization based on functions. We reiterate with a new model and some old cases how isolated reforms have consistently failed.

**065-1978** Not Just Where but How You Look for External Innovation Is Important
Celso Malachias, Student, Fundacao Getulio Vargas, Brazil
Luiz Di Serio, Professor, Fundacao Getulio Vargas, Brazil

The business environment is becoming more complex and dynamic. In this context, the companies should pay more attention to the external opportunities to convert signals into innovation. Our research suggests the innovation, as a result, will be determined by where you search and how you search for external signals.

**562**
**Monday, 11:30 AM - 01:00 PM, Quince**
**Session:** Outcomes-Based Course Design and Assurance of Learning (Workshop)
**Track:** Teaching/Pedagogy in P/OM
**Chair:** Mark Hanna

**065-2053** Outcomes-Based Course Design and Assurance of Learning
Mark Hanna, Professor, Georgia Southern University, United States
Jacob Simons Jr, Professor, Georgia Southern University, United States
Gerard Burke, Associate Professor, Georgia Southern University, United States
Larry Taube, Associate Professor, University of North Carolina Greensboro, United States
Amy Strickland, . . .
Vidyaranya Gargeya, Professor, University of North Carolina Greensboro, United States

OM faculty at two universities have integrated assessment (AoL) into the continuous improvement of their courses and programs. The presentations will illustrate that design for assessment can result in a process that simultaneously satisfies both administrative and instructional priorities with little additional burden on the faculty.

**564**
**Monday, 11:30 AM - 01:00 PM, Begonia**
**Session:** Frontiers of Supply Chain Research
**Track:** Supply Chain Analytics
**Chair:** Xuanming Su, Fei Gao

**065-0094** Returns Policies for Overstock and Consumer Returns in Distribution Channels
Meng Li, Assistant Professor, University of Massachusetts Dartmouth, United States
Yunchuan Liu, Associate Professor, University of Illinois Urbana-Champaign, United States

This paper studies the interactions between an upstream manufacturer and competing downstream retailers on offering returns policies to retailers and end-consumers respectively. The effects of channel structure, demand uncertainty, and retail competition are studied in a unified model covering both overstock returns and consumer returns.

**065-0312** Aligning Incentives in Omnichannel Sale
Elnaz Jalilpour Alishah, Student, University of Washington, United States
Yong-Pin Zhou, Associate Professor, University of Washington, United States
Jingqi Wang, Assistant Professor, The University of Hong Kong, Hong Kong

We consider a retailer with both online and offline channels. While the online store exerts costly effort to attract customers, the offline store handles inventory for both locations - including fulfillment of online orders. We study how the retailer should appropriately credit both channels to align their incentives.

**065-0334** Omnichannel Fulfillment with Ship-from-Store
Fei Gao, Student, University of Pennsylvania, United States
Xuanming Su, Associate Professor, University of Pennsylvania, United States

Many retailers are using stores to fulfill online orders. We study the impact of this omnichannel strategy on retail operations, and develop a simple heuristic policy to implement the ship-from-store program.

**065-0865** One- or Two-Channel Subsidies? Donor Funding for Drug Availability
Iva Rashkova, Assistant Professor, Washington University, United States

In many countries, international donors are the predominant financiers of medicine. They decide between extending grants to public health providers and subsidizing private distributors, while also facing long- and short-term financial constraints. We characterize the optimal fund allocation and provide conditions for the beneficial co-existence of the two channels.
<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>065-1482</td>
<td>The Brazilian Industrial Complex in Camaçari: Challenges of Industrial Decentralization</td>
<td>Caio Lago, Jose Martino Neto, Hellen Chagas, Marcelo Paranzini, Valmir Moura</td>
</tr>
<tr>
<td>065-0651</td>
<td>A Chemical Waste Management / Reverse Logistics Partnership as a Key to Cost Reduction</td>
<td>Neemias Ferreira, Maria Lúcia Da Silva, Janayna Ferreira</td>
</tr>
<tr>
<td>065-0711</td>
<td>A Strategic, Environmentally-Balanced Scorecard to Promote Industrial Ecology Tools</td>
<td>Janaína Gameiro, Maria Lúcia Da Silva</td>
</tr>
</tbody>
</table>