



*Tenth Annual Workshop on  
Supply Chain and Logistics*

May 27, 2016

**Bilkent University**  
Department of Industrial Engineering  
Ankara, Turkey



## Program Schedule

- 09:00- 09:20: Registration and coffee/tea
- 09:20- 09:30: Opening remarks
- 09:30- 10:20: “Perishable Commodity Allocation in Humanitarian Supply Chains with Multiple Demand Types: Effects of Usage Policy and Centralization”  
Melih Çelik, Middle East Technical University  
*Discussant:* Bahar Yetiş Kara, Bilkent University
- 10:20-10:40: Coffee break
- 10:40-11:30: “Pricing When Customers Have Limited Attention”  
Tamer Boyacı, ESMT European School of Management and Technology  
*Discussant:* Joern Meissner, Kühne Logistics University
- 11:30-11:45: Coffee break
- 11:45-12:15: Practice session I  
“Dynamic Route Optimization: Mathematical Optimization and Real Life Challenges”  
Ozan Gözbaşı, Optiyol Decision Analytics
- 12:15-13:30: Lunch break
- 13:30-14:20: Tutorial  
“Establishing Trust and Trustworthiness in Global Supply Chains”  
Özalp Özer, The University of Texas at Dallas
- 14:20-14:40: Coffee break
- 14:40-15:30: “Revenue Management for Intermodal Transportation: The Role of Dynamic Forecasting”  
Yalçın Akçay, Koç University  
*Discussant:* Nesim Erkip, Bilkent University
- 15:30-15:50: Coffee break
- 15:50-16:20: Practice session II  
“Logistic Network Optimization for ETİ Gıda Supply Chain”  
Engin Çölova, ETİ
- 16:30-19:00: Closing cocktail (Rector’s Residence - Building 49)

## **Perishable Commodity Allocation in Humanitarian Supply Chains with Multiple Demand Types: Effects of Usage Policy and Centralization**

Melih Çelik, Middle East Technical University

**Abstract:** Allocation and distribution of health/humanitarian relief commodities are challenging due to insufficiency of supplies, impossibility or reallocation arising from perishability, and varying levels of needs of the beneficiaries. In this paper, we consider the allocation of a perishable commodity from a capacitated warehouse to multiple distribution locations serving multiple classes of beneficiaries. In satisfying the demand, each distribution location applies a usage policy, which determines the order in which the demand is served. We focus on two usage policies: (i) prioritization, where lower-class demand can be served only if there is remaining supply after the demand of higher classes has been served, and (ii) first-come, first-served (FCFS), where beneficiaries are served based on the order of arrival. Given the unit benefits of satisfying demand from each class, usage policies, probability distributions of arrival in each distribution location, and the capacity at the warehouse, we develop myopic algorithms that find the optimal allocation maximizing the expected total net benefit. With two demand classes and Poisson arrivals, we analytically derive the worst-case ratio of the optimal net benefits under FCFS usage to those under prioritization and analyze the effects of serving part or all of the demand classes from a single distribution location, which shows that such a scheme is not necessarily beneficial under FCFS use. We also derive a worst-case ratio of the optimal net benefits under information asymmetry (incorrect usage policy assumption at the warehouse) to those under perfect information. Our computational experiments based on the 2009 H1N1 vaccination campaign underline the importance of demand prioritization and centralization in achieving an effective allocation scheme.

**Melih Çelik** is an assistant professor in the Industrial Engineering Department of Middle East Technical University (METU). Prior to joining METU as a faculty member, he received his B.S. and M.S. degrees in Industrial Engineering from METU, as well as an M.S. degree in Operations Research and Ph.D. from the School of Industrial and Systems Engineering at Georgia Institute of Technology. His research interests include humanitarian applications of IE/OR, warehouse logistics, facility location/layout, and online/stochastic network design.

**Discussant: Bahar Yetiş Kara** is an Associate Professor in the Department of Industrial Engineering at Bilkent University. Dr. Kara holds an M.S. and Ph.D. degree from Bilkent University Industrial Engineering Department, and she worked as a Postdoctoral Researcher at McGill University in Canada. Dr. Kara holds “Best Dissertation Award” given by INFORMS - UPS-SOLA (2001), TUBA-GEBIP (National Young Researchers Career Development Grant) reward (2008), IAP Young Researchers Award (2009), and TÜBİTAK Young Scientist Incentive Award (2010). Dr Kara’s current research interests include distribution logistics, humanitarian logistics, hub location and hub network design, and hazardous material logistics. She is currently an associate editor of IIE Transactions. Dr. Kara is also one of the founders and so one of the members of the current executive board of the EURO Working Group on Humanitarian Operations (HOpe).

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### **Pricing When Customers Have Limited Attention**

Tamer Boyacı, ESMT European School of Management and Technology

**Abstract:** We study the optimal pricing problem of a firm facing customers with limited attention and capability to process information about the value (quality) of the offered products. We model customer choice based on the theory of rational inattention in the economics literature, which enables us to capture not only the impact of true qualities and prices, but also the intricate effects of customer’s prior beliefs and cost of information acquisition and processing. We formulate the firm’s price optimization problem and characterize the pricing and revenue implications of customer’s limited attention. We test the robustness of our results under various modelling generalizations such as prices signaling quality and customer heterogeneity, and study extensions such as multiple products, competition, and joint inventory and pricing decisions. We also show that using alternative pricing policies that ignore the limited attention of customers or their ability to allocate this attention judiciously can potentially lead to significant profit losses for the firm. We discuss the managerial implications of our key findings and prescribe insights regarding information provision and product positioning.

**Tamer Boyacı** joined ESMT European School of Management and Technology in 2015 as a Professor of Management Science. He previously was a Professor of Operations Management and a Desautels Faculty Scholar at McGill University in Quebec, Canada, where he also served as the

Associate Dean for Masters Programs and the Academic Director for the MBA Program. Tamer received his PhD, MPhil, and MSc from Columbia University, New York, USA. Tamer Boyacı's research is wide in scope and highly cross-disciplinary, often cutting across operations, marketing, economics, finance and policy-making. His most recent contributions investigate pricing, price-matching policies, private brands, risk management, as well as mergers and acquisitions. Another major research interest of Tamer links operations to sustainability. His latest works in this domain dwell on take-back legislation and sustainable product design and innovation. Tamer's scholarly work has appeared in the top international journals of his discipline, including Management Science, Operations Research, Manufacturing & Service Operations Management, Production and Operations Management, among others.

**Discussant: Joern Meissner** is Full Professor of Supply Chain Management & Pricing Strategy at Kühne Logistics University. Professor Meissner holds a PhD and a Master's Degree in Management Science from the Graduate School of Business at Columbia University (Columbia Business School) in New York City and a Diploma in Business from the University of Hamburg. His research spans a wide field of study, including the areas of Supply Chain Management (SCM), Pricing Strategy and Revenue Management. His work has been published in various prestigious journals including Operations Research, Manufacturing and Service Operations Management (MSOM), Production and Operations Management (POM), European Journal of Operational Research, International Journal of Production Research, International Journal of Production Economics and Naval Research Logistics. Professor Meissner's main research focus is the area of stochastic and dynamic decision-making, and in particular applications to logistics, manufacturing, supply chain management, and pricing strategy. The aim of his research is to develop and implement robust and efficient techniques to business problems in those domains. A common theme within his research is the use of mathematical optimization techniques such as dynamic programming to guide managers to make better business decisions.

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## **Dynamic Route Optimization: Mathematical Optimization and Real Life Challenges**

Ozan Gözbaşı, Optiyol Decision Analytics

**Abstract:** For FMCG companies, planning delivery routes to determine which vehicles should deliver which orders, and in what order is a daily operational decision. There is a vast operations research literature on this type of vehicle routing problems; however, the applications in real life is unfortunately very rare. In our start-up journey to develop supply chain optimization solutions, we had the chance to spend a lot of time with planners and managers to identify some of the reasons why “the theoretically shortest path” is not always the best solution in real life. We will share our experience in building and implementing a dynamic route optimization solution for an ice-cream brand and provide suggestions for practitioners who would like to implement such solutions.

**Ozan Gözbaşı** holds a B.Sc. degree in Industrial Engineering from Boğaziçi University (2005). He received his M.Sc. degree in Operations Research (2006) and Ph.D. degree in Industrial Engineering from Georgia Institute of Technology, Atlanta (2010). His dissertation focused on optimization algorithms for Cancer Radiotherapy in collaboration with Emory University. He worked as an Algorithm Design Engineer at SmartOps (SAP Labs, Pittsburgh) to develop software for multi-stage inventory optimization (2010-2012). After returning to Turkey, he served as a consultant at a mobile telecommunications operator for sales channel optimization and at a large consumer durable goods manufacturer for pricing analytics. In 2013, he worked at P1M1 as the Manager of Advanced Analytics and Operations Research. He co-founded Optiyol Decision Analytics in 2014, located at Teknopark Istanbul, to develop SaaS solutions for supply chain optimization and revenue management. He is teaching Financial Risk Management course at Özyeğin University and Revenue Management course at Boğaziçi University as a part-time instructor.

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## **Establishing Trust and Trustworthiness in Global Supply Chains**

Presenter: Özalp Özer, The University of Texas at Dallas

**Abstract:** In this presentation, we will discuss when, how, and why the behavioral motives of trust and trustworthiness arise to support credible information sharing and cooperation within and across businesses. We

identify four building blocks of trust and trustworthiness: personal values and norms, market environment, business infrastructure, and business process design. We will elaborate on these building blocks and offer tangible insights about how to establish trusting and cooperative business relationships. To do so, we will provide a high level summary of some research results and case studies from across industries.

**Özalp Özer** is Ashbel Smith Professor of Management Science at The University of Texas at Dallas, Jindal School of Management. He spent his 2013-14 sabbatical as a Visiting Professor at MIT Sloan School of Management. Previously he was a faculty member at Columbia University and Stanford University. His areas of specialty include end-to-end management and coordination of global supply chains, capacity and inventory planning, market timing, distribution channel and logistics management, procurement contract design, retail and pricing management. Besides scuba diving, he is passionate about working with researchers and practitioners on the next new ‘think’ that calls for the exciting opportunity to explore, learn, define, solve, and contribute. Professor Özer is a recipient of the Wickham Skinner Early-Career Research Accomplishment Award from POM Society, the Hellman faculty fellowship, the Terman faculty fellowship, and the Eugene Grant Teaching Award at Stanford by vote of students in 2003 and 2004 and teaching awards at Columbia in 2009 and at MIT in 2014. He is an editor of The Oxford Handbook of Pricing Management published by OUP in 2012. His articles have appeared in journals such as Management Science, and Operations Research. He is currently serving as an associate editor for Management Science, M&SOM, Operations Research, and Production and Operations Management. He is an active consultant to industry and has consulted companies including Ericsson, General Motors, Hitachi GST, and Hewlett Packard. He received his Ph.D. and M.S. degrees from Columbia University.

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## **Revenue Management for Intermodal Transportation: The Role of Dynamic Forecasting**

Yalçın Akçay, Koç University

**Abstract:** We study a joint capacity leasing and demand acceptance problem in intermodal transportation. The model features multiple sources of evolving supply and demand, and endogenizes the interplay of three levers—forecasting, leasing, and demand acceptance. We characterize the optimal

policy, and show how dynamic forecasting coordinates leasing and acceptance. We find (1) the value of dynamic forecasting depends critically on scarcity, stochasticity, and volatility; (2) traditional mean-value equivalence approach performs poorly in volatile intermodal context; (3) mean-value based forecast may outperform stationary-distribution based forecast. Our work enriches revenue management models and applications. It advances our understanding on when and how to use dynamic forecasting in intermodal revenue management.

**Yalçın Akçay** is an associate professor of operations management at the College of Administrative Sciences and Economics of Koç University. He holds a dual Ph.D. degree in Business Administration and Operations Research from the Pennsylvania State University (2002), an MBA degree from the Middle East Technical University (1997), and a B.Sc. degree in Electrical and Electronics Engineering from the Middle East Technical University (1995). Dr. Akçay's research builds, solves, and applies stochastic optimization models to provide insight and to support managerial decision making in manufacturing, service operations, retailing and revenue management. His papers appeared in academic journals such as *Management Science*, *Production and Operations Management*, and *IIE Transactions*, and won the Production and Operations Management Society's Wickham Skinner Best Paper Award (2010), and *IIE Transactions* Best Paper in Design and Manufacturing (2015).

**Discussant: Nesim K. Erkip** joined Bilkent University in 2005. He received M.S. and Ph.D. from Stanford University and his B.S. from Middle East Technical University. Prior joining Bilkent he worked at the Middle East Technical University for over 20 years. He held visiting and research positions at Cornell University, Stanford University, University of California at Berkeley and New York University in the United States and University of Eindhoven in Holland. He served as a Fulbright Scholar in 1995-96. His main research interest is in multi-echelon inventory theory, as well as production and inventory systems. At the moment his research is distribution systems, supply chains and retail systems, as well as other applications of operations research. He has published many academic papers, reports, and book chapters. He has mentored dozens of M.S. and Ph.D. students, and served as associate editor in a few journals. Currently, he serves in the editorial board of *Flexible Services and Manufacturing Journal*. He worked at the Scientific and Technological Research Institute of Turkey (TÜBİTAK), is a founding member of Science and Technology Policy Studies Graduate Program at Middle East Technical University, and had been part of several initiatives active in preparing reports on Science and Technology Policy issues in

Turkey. He has been involved in strategic planning activities for private and public higher educational institutions. Prof. Erkip is a member of the Board of Trustees of TED University since 2010.

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## **Logistic Network Optimization for ETİ Gıda Supply Chain**

Engin Çölova, ETİ

**Abstract:** ETİ distributes its products to a variety of sales points defined in two types: traditional channel (Bakkals, School Canteens, Kiosks and Gas stations) and modern channel (discount stores and supermarkets). The flow of the finished products to those sales points starts from the main DC located in Eskişehir and continues its movement to the sales points through Regional DC's and Distributors. In recent years, the logistic network has grown drastically; the number of the regional DC's has increased from null to 27. Moreover, the sales volume has doubled during this period. The production facilities are also expanding and locations of production are enlarging from Eskişehir to Romania. During this expansion period, the logistic network decisions are made incrementally. Last year, ETİ has initiated a project for the optimization of the logistics network. This talk is on this project and an optimization model that ETİ has built to minimize the network cost consisting of production related costs, transportation and handling related costs and shortage costs. The model considers the design of the entire network including the location of production facilities, main distribution centers and regional distribution centers and all product flow between these locations.

**Engin Çölova** obtained his B.S. and M.S. degrees in Industrial Engineering from Middle East Technical University. Since 2002, he works for ETİ grup. Between 2002 and 2008, he has participated in a variety of projects mainly on supply chain and sales systems in Eskişehir. In 2008, he moved to ETİ's İstanbul Office as a sales systems analyst. Currently, he is the Sales Planning Manager in ETİ Gıda. His areas of interest are demand planning, inventory planning, logistics.

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