■ TD06

Closed-Loop Supply Chain Economics
Cluster: Reverse Supply Chains
Invited Session

Chair: Geraldo Ferrer, Associate Professor of Operations Management, Naval Postgraduate School, Grad Sch of Business and Public Policy, IN-234 555 Dyer Rd, Monterey, CA, 93943, United States, gferrer@nps.edu

1 - Optimal Price and Quantity of Refurbished Products
   Sarah Ryan, Associate Professor, Iowa State University, Industrial & Mfg Sys Engg, 2019 Black Engineering, Ames, IA, 50011-2164, United States, smryan@iastate.edu, Jumpol Vorasayan

New and refurbished products compete for consumers by price and perceived quality. For new products made to order and returns refurbished to stock, we optimize the proportion of returns to refurbish and their sale price in a general open queueing network. Optimality conditions show when refurbishing none, some, or all of the returns will maximize total profit.

2 - Value of Creating a Recollection and Redistribution System for Influenza Vaccine
   Prashant Yadav, Assistant Professor of Supply Chain Management, MIT-Zaragoza International Logistics Program, Zaragoza Logistics Center, Zaragoza, AR, 50009, Spain, pyadav@mit.edu, David Williams

The supply chain for flu vaccine in the US has seen marked shortages and wastage in the last few years.This supply chain is characterized by a high degree of uncertainty in both supply and demand, resulting in order gaming and sub-optimal ordering by the healthcare providers.We characterize the value of establishing a redistribution mechanism and its impact on initial ordering and demand fulfillment.

3 - An Analysis of Decentralized Collection and Processing Operations for end-of-life Products
   Ibrahim Karakayali, Research Assistant, University of Florida, 303 Weil Hall P.O. Box 116595, Gainesville, FL, 32611, United States, ibrahimk@ufl.edu, Elif Akcali, Hulya Emir-Farinas

We analyze decentralized system for end-of-life products where both the supply of end-of-life products and demand for remanufactured parts are price-sensitive. We develop models to determine the optimal acquisition price for the used product and sales price for the remanufactured part in a decentralized setting, where either the collector or the remanufacturer is the leader. We discuss how the decentralized systems can be coordinated to achieve centralized system collection volume and profits.

4 - Managing Distinguishable New and Remanufactured Products
   Geraldo Ferrer, Associate Professor of Operations Management, Naval Postgraduate School, Grad Sch of Business and Public Policy, IN-234 555 Dyer Rd, Monterey, CA, 93943, United States, gferrer@nps.edu, Jay Swaminathan

We study a monopolist that makes new and remanufactured products as a market segmentation mechanism. We characterize the production quantities associated with self-selection, and explore the effect of various parameters in the Nash equilibrium.

■ TD07

OR/MS Modeling in Some Key Manufacturing Problems
Contributed Session

Chair: Douglas Morrice, Professor, The University of Texas at Austin, Red McCombs School of Business, 1 University Station B6300, Austin, TX, 78712-0210, United States, morrice@mail.utexas.edu

1 - Minimizing Setup Time for a Complex Crew Setup
   A. Dale Flowers, Faculty of Operations Management, Case Western Reserve University, Weatherhead School of Management, 10900 Euclid Avenue, Cleveland, OH, 44106, United States, dale.flowers@case.edu, Amit Garg, Kevin Linderman

We consider a production line operated by a crew of people. While changing production from one product to another, multiple tasks have to be completed by the crew members, but not all crew members are capable of performing all tasks. Our research objectives are to assign the tasks to available crew members so as to minimize the time until all tasks are completed, and to explore the impact of worker flexibility on the solution.

2 - Control of Manufacturing Systems using State Feedback and Linear Programming
   Joost van Eekelen, M.Sc., Technische Universiteit Eindhoven, P.O.Box 513, W-Hoog 0.125, Eindhoven, 5600 MB, Netherlands, j.a.w.m.v.eekelen@tue.nl, Erjen Lefeber, Koos Rooda

Most studies on control of discrete event manufacturing systems focus on control in the event domain. However, in production environments, events occur while time elapses. We develop an explicit state feedback controller in MPC setting for a specific class of manufacturing systems. The state of the system is specified as a function of time. For larger systems, where explicit feedback control is too difficult, we present an MPC framework based on repeatedly solving linear programming problems.

3 - Multi-Level Batch Production Smoothing Problem
   Mesut Yavuz, Visiting Assistant Professor, University of Florida, 1350 N. Poquito Road, Shalimar, FL, 32579, United States, yavuzm@ufl.edu

The production smoothing problem (PSP) aims to find smooth schedules for mixed-model production lines. In a smooth schedule, models are evenly dispersed over the schedule. The batch production smoothing problem (BPSP) is an extension of the PSP which allows the models to be produced in batches. This paper addresses the multi-level version of the BPSP. The problem is modeled as an optimization problem, its computational complexity is shown and heuristic solution methods are proposed.

5 - Designing and Operating a High-Volume, Make-to-Order Assembly Line under Uncertain Demand
   Douglas Morrice, Professor, The University of Texas at Austin, Red McCombs School of Business, 1 University Station B6300, Austin, TX, 78712-0210, United States, morrice@mail.utexas.edu, Fehmi Tanrisever

We address the problem of designing and operating a flexible assembly line for a make-to-order electronics assembly firm to minimize the costs of setups and lost demand. During the design of the assembly line the firm must also determine the number of lanes per line by incurring a fixed cost which reduces the setup requirements during the operations. We formulate this problem as a stochastic assignment problem and characterize the optimal level of flexibility under stochastic demand.

■ TD08

Human Aspects in Operations Management
Sponsor: Manufacturing & Service Oper Mgmt
Sponsored Session

Chair: Jay Swaminathan, UNC - Chapel Hill, McColl building, 4717, Chapel Hill, NC, United States, msj@unc.edu

1 - Impact of Sales Force and Effective Incentive Structure on Supply Chain Performance
   Gigi Yuen, Northwestern University, 2145 Sheridan Road, C229, Evanston, IL, 60208, United States, gigiyuen@northwestern.edu, Wallace Hopp, Seyed Iravani

In many supply chains, it is common practice for manufacturers to use a sales force to promote sales and improve coordination with retailers. In this paper, we investigate the impact of a salesperson on the profit of the manufacturer and the overall supply chain. We show how a proper compensation plan for salesperson can serve as a mechanism for improving supply chain efficiency.

2 - An Experimental Investigation of Supply Chain Contracting Mechanisms
   Elena Katok, Associate Professor, Penn State University, 5F BAB, State College, PA, United States, ekatok@psu.edu, Yan (Diana) Wu

The topic of supply chain coordination is a much studied one. While theoretical properties of various contracting mechanisms have been studied extensively, much less is known about their practical performance. We compare several contracting mechanisms in the controlled setting of an experimental laboratory to investigate their performance.

3 - Is Timely Information Always Better? The Effect of Feedback Frequency on Performance and Knowledge Acquisition
   Jay Swaminathan, UNC - Chapel Hill, McColl building, 4717, Chapel Hill, NC, United States, msj@unc.edu, Nicholas H. Lurie

The effect of frequent information updates on human decision making has not been studied in the past. In this research, using two experimental studies in a newsvendor setting and a management simulation, we show that in an environment characterized by random noise, more frequent feedback can potentially lead to declines in performance. This effect does not change significantly for cases where there is a cost associated with making a change and is amplified in environments that have a higher degree of randomness.