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<th>Game Theory Applications</th>
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<td>Analysis of a Two-Stage Service Process: Coordination of Staffing and Effort (Yong-Pin Zhou)</td>
<td>Supply Chain Oriented Operations, Organizational Learning, and Performance in Logistics Service Providers in China (Ivy S.N. Chen)</td>
<td>The Impact of Minimum Profit Share Ratio Concern on a Supply Chain with Buyback Contract: An Experimental Study (Yulan Wang)</td>
<td>A Lexicographic Quota Model for Allocating Initial Discharge Permits for Industrial Source Points in a Lake Basin (Huimin Wang)</td>
<td>Machine Building Plant Infrastructure in the CIS Countries (Anastasiia Rykunich)</td>
<td>Dual Prices with Game Model as an Evaluation Tool for A Potential Being Merged High-Tech Company (Ming-Hao Huang)</td>
<td>Facilities and Routes Disruption Recovery Management (Lindong Liu)</td>
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<td>Joint Product Improvement by Client and Customer Support Center: The Role of Gain-Share Contracts in Coordination (Sameer Hasija)</td>
<td>The Analysis of Influencing Factors and Benefit for Food Companies to Successfully Implement HACCP -- food companies in Tianjin for example (Lili Fu)</td>
<td>Uers’ video paying mode choice behavior: A Research Based on Extended NBD-Dirichlet Model (Qixing Qu)</td>
<td>Study on the recycling and treatment of WEEE in China (Bibo Yang)</td>
<td>The Impact of Control Charts in Industrial Helpdesk Management (Jun Jie Ng)</td>
<td>Some relations between supply-demand network equilibrium model and variational inequalities (Yunan Wu)</td>
<td>Model and algorithms for optimized post-disaster relief distribution (Haijun Wang)</td>
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<td>The Rate Control Policy for Many-Server Queues with Abandonment (Zhenghua Long)</td>
<td>Consumers’ Willingness to Pay for HACCP and its Influencing Factors (Yin Beina)</td>
<td>Web System Upgrading with Transaction Failure and Strategic Customers (Xiaoxue Deng)</td>
<td>Extending Average Value at Risk to Markov Decision Processes (Fernando S. Oliveira)</td>
<td>Hub and Chain: A Variance-Based Method for Designing Process Flexibility (Zhiguang Han)</td>
<td>Information Revelation Mechanism of a Supply Chain with Demand Forecast Updating and Asymmetric Operation Cost Information (Dangui Yang)</td>
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<td>Perspective of Trust</td>
<td>(Wu Chuan-zhen)</td>
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<td>Modeling decision processes of a green supply chain with regulation on energy saving level (Gang Xie)</td>
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<td>On the Roles of Price Negotiation and Extended Warranty in a Distribution Channel (Chia-Wei Kuo)</td>
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<td>New Product Pricing Strategy in the Social Media Era (Xiaohang Yue)</td>
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<td>Sustainability and Risk Management for Critical Infrastructures (Chao Fang)</td>
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<td>New Products Reliability Evaluation Model (João Chang Junior)</td>
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<td>A Multi-Stage Stochastic Programming Model for Managing a Sustainable Fleet Portfolio System (Amir Hossein Ansariipoor)</td>
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<td>The influence of local bandwagon effects on diffusion of innovation (Yang Shanshan)</td>
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<td>A Gradient Approach to Efficient Design of CUSUM Charts Under Uncertainty (Wenpo Huang)</td>
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<td>Resource Sharing between Two Express Delivery Service Companies (Friska Natalia Ferdinand)</td>
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<td>Research on Option Coordination Contract for Waste-Collector Dominant Reverse Supply Chain (Kejing Zhang)</td>
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<td>Optimal Energy-Saving Subsidy Contract on Durable Product (Wenhui Zhou)</td>
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<td>How Reference Points and Competition Effect Firms’ Price and Quality (Li Juan)</td>
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<td>Carbon Permit Contract Design and Technology Selection for a Manufacturer (Emre Berk)</td>
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<td>The Role of ABET Quality assurance in Identifying Engineering Education Deficiences: A diagnostic tool (Ayham A.M. Jaaron)</td>
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<td>Dynamic Resource Planning for Order Sortation in an Express Gateway: A Simulation Study (Xiang TR Kong)</td>
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<td>Research on Incentive Mechanisms for Waste-Collection Network based on Online-Stores (Sufen Wang)</td>
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<td>Dynamic Bargaining in Supply Chain with Asymmetric Demand Information (Lai Guoming)</td>
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<td>Social Network Sites, Self-disclosure, Social Capital, Personality Traits (Chen Xi)</td>
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<td>Strategic sourcing in the UK bioenergy industry (William Ho)</td>
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<td>The Use of CUSUM Control Charts to Monitor Exercise and Hypertension (Jeng Shiou-yun)</td>
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<td>How to Catch Up a Delayed Journey (Chen Li)</td>
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<td><strong>Sharing Demand Information in Competing Supply Chains with Suppliers’ Cost Reduction Efforts (Quan Jinghan Tian)</strong></td>
<td><strong>Ingredient Branding Strategies in a Dynamic Supply Chain: Models and Analysis (Juan Zhang)</strong></td>
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<td><strong>Firms’ profits and consumer surplus when a retailer contemplates selling online (Yu Xiaowen)</strong></td>
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<td>Information Disclosure, Supplier Contracting and Capital Market Interaction (Fang Yaner)</td>
<td>Portal Advertisement Scheduling with Different Banner Categories (Leon Kao)</td>
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<td>Stochastic Inventory Systems with Planning Horizon Ordering Constraints (Rowan Wang)</td>
<td>How Prudence and Willingness-to-Pay Shape Price Trends in a Dynamic Pricing Model (Xiaowei Xu)</td>
<td>Dynamic Priority Optimization Request Scheduling for Business Web Server Based on Reward-Driven Request Classification (Chen Meimei)</td>
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<td><strong>Earned Value Analysis and Application Based on Grey Control Chart (Feng Junwen)</strong></td>
<td>Process Flexibility Design Using Demand Variance Information (Geoffrey A. Chua)</td>
<td>Modeling of a New System for Scheduling Elective Surgery in a Hospital: a case study at Hospital São Paulo – UNIFESP (João Chang Junior)</td>
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<td><strong>Optimal Production and Pricing Policy in a Make-to-Stock System Subject to Machine Breakdowns (Ting Wu)</strong></td>
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<td>Decision supporting model combined with smart grid for the application of mobile compound green power system (Yung-Ming Wang)</td>
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<td>The Effects of E-CRM Quality on Online Customer Ratings and Organizational Financial Performance (Jenny Tian)</td>
<td>Pricing Path-dependant Options Driven by CGMY Process with Importance Sampling (Guangxin Jiang)</td>
<td>Scheduling of Multi-skilled Staff Across Multiple Locations (Yong-Hong Kuo)</td>
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<td>Retail Supply Chain Coordination Forecasting Modeling (Wang Wenjie)</td>
<td>Kullback-Leibler Divergence Constrained Distributionally Robust Optimization (Hu Zhaolin)</td>
<td>Graph-based formulations for the Shift Rostering Problems (David S.W. Lai)</td>
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1. Analysis of a Two-Stage Service Process: Coordination of Staffing and Effort

Yong-Pin Zhou (School of Business, University of Hong Kong)
Azin Farzan (Michael G. Foster School of Business, University of Washington, Seattle)

Abstract: We analyze a two-stage service process. Staffing and effort decisions are made at each stage to affect waiting time and service quality. Moreover, first-stage effort also impacts the second-stage service quality. When this effect is not properly accounted and compensated for, the first stage under-invests in effort. Common contracts fail to coordinate, and we propose a new Quality Adjusted (QA) contract that can coordinate. Additionally, we investigate the impact of outsourcer pooling. We show that QA continues to coordinate and, with identical clients, pooling is beneficial. With non-identical clients, however, we give examples where pooling may lead to profit loss.

2. Joint Product Improvement by Client and Customer Support Center: The Role of Gain-Share Contracts in Coordination

Sameer Hasija (INSEAD),
Shantanu Bhattacharya (INSEAD),
Alok Gupta (University of Minnesota)

Abstract: We study the role of different popular contract types, such as gain-share and cost-plus contracts, in coordinating the joint product improvement effort of a client and a customer support center. The cooperative role of the support center in product improvement must be adequately incentivized by the client, since it could lead to fewer service requests for the support center. We model this problem as a sequential game with double-sided moral hazard in a principal-agent framework. We follow the contracting literature in modeling the effort of the customer support center, which is the first mover, as either unobservable or observable.

3. The Rate Control Policy for Many-Server Queues with Abandonment

Zhenghua Long (The Hong Kong University of Science and Technology),
Jiheng Zhang (The Hong Kong University of Science and Technology)

Abstract: We consider a multiclass queueing system with a pool of many homogeneous servers and customer abandonment. Customers from different class have different service and patience times, which follow general probability distributions. We establish the fluid approximation of such a system under a general class of control policies, called rate control policies. Based on the fluid model, we identify the optimal policy for minimizing the holding and abandonment cost of such system. In special cases, the optimal control policy becomes the $c\mu/\theta$ rule as proposed by Atar et al (2010). However, in general, an optimal policy shall utilize information on the system status when the patience time is not exponentially distributed.

4. Optimal Contracts for Outsourcing of Repair and Restoration Services

Nitish Jain (Technology and Operations Management, INSEAD),
Sameer Hasija, (Technology and Operations Management, INSEAD),
Dana G. Popescu (Technology and Operations Management, INSEAD)

Abstract: Outsourcing of equipment repair and restoration is commonly practiced by firms in many industries. The operational performance of equipment is determined by joint decisions of the firm (client) and the service provider (vendor). Although some decisions are verifiable and thus directly contractible, many decisions are not. The result is a double-sided moral hazard environment in which each party has incentives to free-ride on the other’s effort. A performance-based contract allows the client to align the incentives of the vendor, but it also exposes the vendor to stochastic earnings and thereby creates disincentives to make first-best decisions. To capture these issues, we develop a novel principal–agent model by integrating elements of the machine repairman model and a stochastic financial distress model within the double-sided moral hazard framework. We apply our model to solve the client’s problem of designing the optimal performance-based contract. We find that the client can attain the first-best profit by restricting the search space to only two classes of performance-based contract structures: linear and tiered. We show that the linear contract structure has limited ability in attaining the first-best outcome, contingent on the vendor’s exogenous characteristics. In contrast, the tiered contract structure enables the client to attain the first-best outcome regardless of vendor characteristics. Our results provide normative insights on the role of contract structures in eliminating any loss due to double-sided moral hazard or to the vendor’s financial concerns. These results also provide theoretical support for the extensive use of tiered contracts observed in practice.

SESSION 1 M4003
January 3, 2013 11:00 – 12:30

Supply Chain Management
Session Chair: Jun Shan (Business School, Nankai University),

1. Supply Chain Oriented Operations, Organizational Learning, and Performance in Logistics Service Providers in China

Ivy S.N. Chen (The Hong Kong Polytechnic University),
Patrick K.O. Fung (The Hong Kong Polytechnic University)

Abstract: Logistics service providers (LSPs) enhance the value of goods flowing across organizations through operational tasks which are supply chain oriented. In changing global business environments, LSPs’ supply chain oriented capabilities must lead to intra-organizational learning that would sustain continuous improvement and hence competitive performance. A research model was established in this context and tested on a sample of 164 LSPs in China using Partial Least Squares. The results confirm the schematic of the relationships and management implications are drawn for ways to improve logistics service performance.

2. The Analysis of Influencing Factors and Benefit for Food Companies to Successfully Implement HACCP –food companies in Tianjin for example

Lili Fu (Tianjin University),
Zhen He (Tianjin University)

Abstract: An influencing factors-benefits model based on the cognitive-behavior model is proposed to identify the factors and to evaluate
the benefits of Hazard Analysis Critical Control Point (HACCP) in food companies. A questionnaire survey is taken among the food companies in Tianjin. It proves that the leader’s attitude, the company’s condition, the implementation process and the external environment are the four factors that influence the implementation of HACCP in the company. The significant benefits for the company are the improvements of product’s safety, social responsibility. Finally, some recommendations are developed for the implementation of HACCP in food companies.

3. Consumers' Willingness to Pay for HACCP and its Influencing Factors

Beina Yin (Tianjin University), Zhen He (Tianjin University)

Abstract: Nowadays, food companies in China encounters challenges in creating a reputation for high-quality products. In order to ensure food safety, Hazard Analysis Critical Control Point (HACCP) is implemented in many food companies. This study aims at investigating the consumers’ preferences and willingness to pay (WTP) for HACCP-certified food. A survey on consumers in Tianjin shows that there are 56.5% of the consumers willing to pay a modest price premium. Finally, five key factors of WTP, including consumers’ job, education, concern on the price, awareness of HACCP, and purchase intention, are found via statistical analyzing the questionnaires.

4. An Empirical Study of the Bullwhip Effect in China

Jun Shan (Business School, Nankai University), Shitao Yang (University of Illinois at Urbana-Champaign), Shilei Yang (Southwestern University of Finance and Economics), Jin Zhang (Nankai University)

Abstract: In this study, we investigate the bullwhip effect in China using data on over 1,200 companies listed on the Shanghai and Shenzhen stock exchanges from 2002 to 2009. Specifically, we estimate the ratio of the volatility of production to the volatility of demand as a proxy for the bullwhip effect. Our results show that more than 2/3 of the companies we studied exhibit the bullwhip effect. We also find that several hypotheses proposed in the existing literature are supported by firm-level data from China, and that the intensity of the bullwhip effect in China declined during the period from 2002 to 2009.
experiments show that MPSR has significant impact on the wholesale price, the profits of the supplier and retailer, and the profit coefficient of variation of the supply chain. When MPSR is 0.5, the whole supply chain achieves the best performance with its profit mostly close to the theoretically optimal one. Last, we propose a modified coordinating buyback contract.

2. Users' video paying mode choice behavior: A Research Based on Extended NBD-Dirichlet Model

Qixing Qu (Beijing University of Posts and Telecommunications),
Jiayin Qi (Beijing University of Posts and Telecommunications)

Abstract: It is a trend to pay for video, and video sharing websites such as Hulu and Youku have launched some paying mode. Faced with the different modes, Internet users must make their choice. This paper chose to learn from the discrete choice models to investigate users' choice behavior. Through analyzing the choice behavior, we try to construct NBD-Dirichlet model to describe users' paying mode choice behavior, and enable the model to solve two important issues on choice what and choice how many. Results of this paper might be helpful for the future development of why users choice some paying mode by introducing explanatory variables into the proposed model.

3. Web System Upgrading with Transaction Failure and Strategic Customers

Xiaoxue Deng (National University of Defense Technology),
Jincai Huang (National University of Defense Technology)

Abstract: We consider pricing and web system upgrading problems for an online retailer facing strategic customers. Strategic customers will anticipate the possibility of transaction failure in the process of online purchasing and make decisions based on it. We prescribe a threshold policy: the customer will buy the product if his valuation for this product is above a threshold, and will not otherwise. We also derive the optimal price of each period and identify the optimal policy for web system upgrading. Third, we find that the profit loss rate of ignoring customer strategic behavior increases as customer transaction cost increases, customer valuations for the product become lower, or customers become more risk averse.


David Yanyi Yang (CUHK),
Frank Chen (CUHK),
Chun-Hung Cheng (CUHK)

Abstract: Group buying has gained wide acceptance in recent years. In this talk we try to address the following questions. For a seller, how to choose group buying parameters, such as prices, quantity limits, and time deadlines? When the seller also engages in regular sales, the design of parameters needs to coordinate with the direct channel.
Gang Liu (HOHAI University),
Lei Qiu (HOHAI University)

Abstract: This paper investigates how to allocate quota permits for initial discharge from industrial point sources in a lake basin. The model takes fairness, efficiency and feasibility as basic principles. By introducing a weighted lexicographic minimization of the maximum initial discharge permit shortage rate for different industrial point sources, this paper proposes a quota allocation model and furnishes a solution procedure for determining initial discharge permits for multiple pollutants involving a finite number of initial discharge permits. A case study is developed to examine a single-period allocation problem of initial ammonia nitrogen (NH3-N) discharge permits among 27 key industries in Lake Tai in Jiangsu, China. A comparative study is conducted to assess the impact on industrial pollution control by different solutions based on the proposed approach and two other models. Analytical results demonstrate that the proposed lexicographic quota model achieves the lowest average shortage rate of 46.13% across industries, helps to enhance efficient implementation of the allocation scheme among multiple stakeholders and feasibility of adjusting industrial planning for the lake basin. In addition, the proposed model maximizes the average industrial pollution control benefits. Empirical analyses also indicate that appropriate changes in model weights can effectively affect initial discharge permit shortage rates and industrial pollution control results, thereby attaining the goal of fair, efficient, and feasible allocation.

2. Study on the recycling and treatment of WEEE in China

Bibo Yang (Hong Kong Polytechnic University),
Ren Xia Chen (Shanghai University)

Abstract: This paper investigates the regulations, recycling and treatment of WEEE (waste electrical and electronic equipment) in China. Two different WEEE recycling networks are considered. In the first network, WEEE is collected and sent by recycling stations to licensed WEEE recycling and treatment centers for testing and dismantling. In the second network, WEEE are tested and dismantled at small recycling workshops in residential districts, and then parts/components that require further processing are sent to licensed WEEE recycling and treatment centers. The performances of the two networks are analyzed and compared.

3. Extending Average Value at Risk to Markov Decision Processes

Fernando S. Oliveira (ESSEC Business School),
Frederic Murphy (Temple University)

Abstract: Average value at risk (AV@R) has been successful at capturing risk aversion in single-period models. We provide a nonlinear programming formulation of the AV@R and an algorithm in Markov decision processes. We analyze the properties of the AV@R in terms of time and state consistency, and in terms of the complexity of computing the AV@R. We illustrate how this formalization of AV@R in Markov decision processes can be used in managing a strategic petroleum reserve.

4. Single machine scheduling with time- and number-dependent maintenance activities

Jen-Shiang Chen (Takming University of Science and Technology)

Abstract: Production scheduling and preventive maintenance are the two important activities in the production system. Machines may be unavailable because of preventive maintenance. When should the machine preventive
maintenance be done? It depends on how long have the machine been operating and how many jobs are completed. This study considers batch operations scheduling on a single machine and attempts to simultaneously schedule orders and maintenance activities to minimize the total completion time. According to the “time-dependent” or “number-dependent” for the maintenance activity, the mixed binary integer programming models are developed to optimally solve the above proposed problems.

SESSION 1 M4053
January 3, 2013 11:00 – 12:30

Quality Control
Session Chair: Anastasiia Rykunich (The Kyiv National Economic University)

1. Machine Building Plant Infrastructure in the CIS Countries
Anastasiia Rykunich (The Kyiv National Economic University),
Vadym Hetman (The Kyiv National Economic University),
Genefa Shvydanenko (The Kyiv National Economic University)

Abstract: The paper offers for consideration a new definition of the machine building plant infrastructure, reviews its structural components and suggests techniques for efficient and sustainable infrastructural management in the CIS countries. The article views infrastructure as a set of fundamental activities and functions that creates operating medium for all the manufacturing, financial, marketing, or human resource activities at the plant, inside or outside the companies’ physical facilities, performed by its own or outsourced personnel. Its management should be enhanced through sustainable plant construction, efficient plant layout, use of total production maintenance, lean supply chain, digital and environmentally sustainable technologies, etc.

2. The Impact of Control Charts in Industrial Helpdesk Management
Jun Jie, Ng (National University of Singapore)

Abstract: Industries use statistical process control charts (SPC) and techniques for process improvement. By analysing the trend of the SPC charts, management take actions to improve the overall quality of the process or a system. This document serves to give an insight to how SPC can be used in helpdesk management. Variations are inevitable in any process. The use of control charts serve to help management make decisions when assignable-cause variations are found present in the process or system and therefore implying there is a need to take actions to either eliminate them and to improve their process for the customer satisfaction.

3. Hub and Chain: A Variance-Based Method for Designing Process Flexibility
Han Zhiguang (Nanyang Technological University),
Chen Shaoxiang (Nanyang Technological University),
Geoffrey A. Chua (Nanyang Technological University)

Abstract: We study the process flexibility design issue. To our best knowledge, the demand variance has been generally ignored in the literature. We investigate the effect of demand variance and present a variance-based method to construct good flexible structures that link several small chains together in a hub. Our numerical tests show that our method performs much better than existing methods such as
chaining and constraint sampling, in terms of computational time and structure quality.

4. **Glaucoma Detection using linear-combinations of Neuro inference systems (LINIS)**

Wheyiming T. Song (National Tsing Hua University),
La Ing-Chou (Chang Gung Memorial Hospital),
Michael Chuang (University of California),
Ray Lo National (Tsing Hua University)

**Abstract:** Motivated by the increasing number of glaucoma patients and the difficulty of early glaucoma detection, we propose to investigate strategies for constructing an efficient classifier to differentiate between normal and glaucomatous eyes and further propose early glaucoma detection strategies. The proposed classifier is based on linear-combinations of neuro inference systems (LINIS). The results show that the proposed LINIS has improved the sensitivity and specificity for data from the quantitative assessment of summary data reports of the Stratus optical coherence tomography (OCT) in Taiwan Chinese population.

**SESSION 1 M4023**
**January 3, 2013 11:00 – 12:30**

**Game Theory Applications**
Session Chair: Yunan Wu (Beijing Foreign Studies University)

1. **Dual Prices with Game Model as an Evaluation Tool for A Potential Being Merged High-Tech Company**

Ming-Hao Huang (Chunghua University),
Ling-Feng Hsieh (Chunghua University)

**Abstract:** How to evaluate the price or value of this merged company based on different viewpoint, they are not the same and fair solution to evaluate. Some papers discussing about the pattern evaluation or a company. The evaluation methods are: (1) Financial Programming Approaching (exp: Cost, Revenue Return, Stock Evaluation…etc.) (2)Marketing Approach (3) Pattern Damage awards (For claim or recover) Game Theory Method is considered with strategy for both sides. By using above mentioned reference evaluation, and choose “Top” and “Bottom” prices that dealing companies would like to accept by their roles in merging process.

2. **Some relations between supply-demand network equilibrium model and variational inequalities**

Yunan Wu (Beijing Foreign Studies University)

**Abstract:** We consider a vector supply-demand network equilibrium model on the basis of Wardrop’s equilibrium principle. We prove that such a network equilibrium model is equivalent to a system of variational inequalities. That is, we derive the necessary and sufficient conditions for network equilibrium in terms of a system of variational inequalities by the Gerstewitz’s function when the cost function is vector-valued. This result is derived based on conditions that are weaker than those for many existing results.

3. **Information Revelation Mechanism of a Supply Chain with Demand Forecast Updating and Asymmetric Operation Cost Information**

Danqin Yang (Nanjing University of Science & Technology, The Hong Kong Polytechnic University)
**Abstract:** In this paper, we consider information revelation mechanism designing of a supply chain consisting of one manufacturer and one supplier under partial forecast updates, respectively. The manufacturer with private information on its operations cost (low or high type) procures one critical component from the supplier who requires the manufacturer to reserve the capacity under demand uncertainty. We design a menu of reservation contracts to induce the manufacturer to reveal its cost information truthfully. We try to explore the effects of the forecast update on the information revelation mechanism. The greater amount of forecast update weakens the supplier’s motivation to use information revelation mechanism. The benefit from using revelation mechanism decreases in the unit salvage value of unused capacity and critical component and unit shortage cost, however, increases in the unit capacity investment cost and demand variance.

4. **Assessing outsourcing cost-effectiveness using fuzzy multiple goal programming approach**

Earl-Juei Wang (National Pingtung University of Science and Technology), Chun-Yu Lin (National Pingtung University of Science and Technology)

**Abstract:** This work elucidates the relationship between capacity planning and suppliers with a focus on quantity allocation, manufacturing quantity, capacity limit, warehouse space, and time period for the specific production planning. Fuzzy multiple goal programming approach is adopted to model total cost, holding cost, and rework cost in order to analyze the relative cost-effectiveness of different factors. The proposed model of cost-effectiveness accommodates variables such as multiple components, quality, and responsiveness, and integrates multi-stage functions. Various scenarios are designed to analyze the transaction options for outsourcing under combined schemes. The analytical results can help decision makers to systematically analyze the cost effectiveness of outsourcing during capacity planning.

**SESSION 1 M4024**
**January 3, 2013 11:00 – 12:30**

**Supply Uncertainty and Disruption Management**
Session Chair: Sang Hwa Song (University of Incheon)

1. **Facilities and Routes Disruption Recovery Management**

Lindong Liu (HKUST), Xiangtong Qi (HKUST)

**Abstract:** In this work, we consider two disruption recovery problems. Firstly, we investigate a facility recovery scheduling problem to minimize the total weighted waiting time. A backward heuristic algorithm and a heuristic algorithm based on Lagrangian Relaxation method are developed. Secondly, we consider a resource assignment problem to minimize the total weighted delivery cost. A Lagrangian heuristic algorithm is developed. Furthermore, we will investigate the situation where recovery activities involve multiple decision makers, and a good cost share allocation is computed for this combinatorial cooperative game. Computational experiments are carried out to analyze the performance of these algorithms.

2. **Model and algorithms for optimized post-disaster relief distribution**
Haijun Wang (Huazhong University of Science and Technology),
Lijing Du (Huazhong University of Science and Technology)

Abstract: The effective distribution of critical supplies in post disaster plays a crucial role for rescue operations, especially, in fatal natural disasters. The location of distribution centers and vehicle routing in the available transportation network are two of the challenging issues in emergency logistics. This paper constructs a location-routing model for relief distribution problem with multiple conflicting objectives by considering travel time, the total cost, and reliability. The improved non-dominated sorting differential evolution algorithm is introduced to solve the proposed model. Case studies based on the 2008 Wenchuan earthquake in China are presented to demonstrate the approach and its application in practice.

3. The Value of Information on Supply Uncertainty

Sang Hwa Song (University of Incheon),
Taesu Cheong (National University of Singapore),
Jaegon Kim (University of Incheon)

Abstract: As supply chains go global and outsourcing becomes prevalent in manufacturing and logistics, companies face new challenge of managing unreliable supply source that may fail to supply enough quantities mainly due to random yield. In this paper, we first understand the value of information on supply uncertainty with numerical experiments, and then explore the trade-off between supply reliability improvement and the total expected profits. In regards to the value of supply risk information, we consider three different scenarios (no information, partial information and full information on random supply loss) and see how the degree of understanding on the supply uncertainty can affect the optimal decisions and the overall system performance. We also explore the existence of a stochastic order in supply reliability that guarantees the monotonic results in the expected profits while stochastically improved performance may not necessarily result in the overall profit improvement in general.

4. Contingency Planning in the Formation of a Supply Chain

Renato de Matta (University of Iowa)

Abstract: With today’s growing number of geographically dispersed facilities amplifying the likelihood of supply disruptions, contingency planning has become an important strategic issue for manufacturers and distributors. Contingency planning involves the additional investment in production capacity to mitigate the adverse effects of supply disruption. It also find ways to employ the capacity that is on stand by for productive uses. We formulate a network design optimization model for supply chain contingency planning. We develop an efficient Benders decomposition-based solution procedure which exploits the natural partition between the logistics and pricing decisions in a global supply chain problem. Computational results are presented.
1. **Modeling decision processes of a green supply chain with regulation on energy saving level**

Gang Xie (Chinese Academy of Sciences)

**Abstract:** We first investigate the impact of threshold value of energy saving level set by the policy maker on energy saving level and price of the environmentally friendly product (EFP) decided by green supply chains within two different structures, vertical integration and a decentralized setting. Then, considering the tradeoff between energy savings and profits of supply chains, we analyze decisions of the policy maker. In addition, we investigate the coordination of a supply chain by using the common wholesale pricing and profit sharing schemes. The investigation suggests that vertical integration and coordination should be advocated when regulation is implemented.

2. **Closed-Loop Supply Chain Models with Trade-in and Remanufacturing**

Zhaowei Miao (Xiamen University), Zhiqiang Xia (Xiamen University)

**Abstract:** Recently, remanufacturing and trade-in, as two significant operations of the reverse logistics which is a part of the closed-loop supply chain (CLSC), attract attentions of researchers both in academy and practice. This paper investigates both of these two operations and develops a decision mechanism for the selection of the reverse logistics strategy, including the NN (i.e. no trade-in or remanufacturing) strategy, the TN strategy (i.e. trade-in without remanufacturing), and the TR (i.e. trade-in with remanufacturing) strategy, as well as pricing regime for each strategy. Since the TR strategy is the most eco-friendly one, we mainly focus on this strategy by characterizing both the conditions for its adoption, and the optimal pricing regime under different kinds of market situations. The results show that market factors, including customers’ valuation for used products, customers’ valuation for remanufactured products and market growth rate, have great impact on the strategy selection and optimal pricing regime. Besides, competition from another OEM can boost the adoption of the TR strategy if new products are valued highly enough by customers. Finally, from numerical experiments, we find that commitment of the OEM to strategic customers may go against the OEM’s profit though relax the conditions of applying the TR strategy.

3. **Research on Option Coordination Contract for Waste-Collector Dominant Reverse Supply Chain**

Kejing Zhang (Donghua University), Sufen Wang (Donghua University)

**Abstract:** In the electronic waste reverse supply chain, both supply and demand are subject to great uncertainty in the procurement decision making. In order to improve the efficiency and profit, this study presents a coordination mechanism based on option contract for the two-echelon reverse supply chain, with electronic waste collectors in dominant position. Models are built to show how the e-waste recycler makes optimized purchasing decision, through three different modes of procurement, such as long-term fixed contract, option contract and spot-market purchasing. Simulation illustrates how option contract can be used to improve the profit of the reverse supply chain.

4. **Research on Incentive Mechanisms for Waste-Collection Network based on Online-Stores**

Sufen Wang (Donghua University), Kejing Zhang (Donghua University)
Abstract: To tackle the major problem of China’s e-waste recycling industry, an innovative collection system is proposed, with online store like Suning Yigou as the central waste collector. Three incentive mechanisms between the stakeholders (government, end consumers and third party collectors) are analyzed: 1) Government incentive is used to compensate the collection effort, and further increase the supply volume; 2) Central waste collector provides credit points to consumers who return discarded electronic products, and the credit point can be used to buy new products from the online store; 3) Coordination contract based on two-part tariff is presented to improve the profitability of both downstream and upstream e-waste collectors.

SESSION 2 M4003
January 3, 2013 14:00 – 15:30

Supply Chain Management
Session Chair: Sean Zhou

1. On the Roles of Price Negotiation and Extended Warranty in a Distribution Channel

Chia-Wei Kuo (National Taiwan University), Kwei-Lung Huang (National Taiwan University), Hsing-Ping Kuo(University of North Carolina at Chapel Hill)

Abstract: We consider a manufacturer sells a product through a retailer. The retailer determines the pricing policy – posted pricing or negotiation, and whether to bundle the product with extended warranty. Our result shows pricing policy has significant effect on whether the retailer bundles the product with extended warranty. Depending on the costs of negotiation and initiating the extended warranty, we show the conditions under which a pricing policy is used or not.

2. Target-Oriented Optimization for Inventory Management

Chen Wang (Singapore Management University), Yun Fong Lim (Singapore Management University), Melvyn Sim (National University of Singapore)

Abstract: We propose a target-oriented robust optimization method to solve a multi-period inventory management problem subject to inventory and ordering capacity constraints. Under our approach, only support sets of product demands are required. A solution of our model guarantees, as much as possible, fulfillment of a pre-specified target cost. By tuning this target cost, the solution can achieve a balance between its cost and its associated risk. Simulation studies based on data from a service-part distributor suggest that, if demand distributions are only partially known, our approach significantly outperforms the results of dynamic programs.

3. Optimal Energy-Saving Subsidy Contract on Durable Product

Wenhui Zhou (South China University of Technology), Weixiang Huang (South China University of Technology), Sean X. Zhou (The Chinese University of Hong Kong)

Abstract: As we well known, energy subsidy is an effective and widely-used policy to encourage companies to produce environment-friendly product. For example, China's National Development and Reform Commission (NDRC) has announced details of the new energy-saving
subsidy on home appliances. In this research, we study a energy-saving subsidy contract provided by the government in a duopoly market. Two firms produce a kind of produce durable product, such as TV, washing machine, vehicle and so on. The durable products consume energy when being used. The government subsides the customers who bought the product with eco-label. The Objective of the paper is to investigate how do the subsidy policy affect the decisions of the firms on their own product energy consumption. To this end, we model the competition as three-stage game: in the first stage, the government claims the subsidy contractual agreement. In the second stage, two firms decide whether or not accepts the contract, and then determine their own product energy consumption and compete with prices. Finally, the customer make a choice whether or not purchase the product. We show that the energy-saving subsidy policy induce the firms produce less energy consumption product.

4. Dynamic Bargaining in Supply Chain with Asymmetric Demand Information

Guoming Lai (University of Texas at Austin),
Annabelle Feng (University of North Carolina at Chapel Hill),
Lauren Lu (University of North Carolina at Chapel Hill)

Abstract: We study supply contracting with dynamic bargaining under asymmetric information. The buyer knows the demand state (either high or low), while the seller knows only the prior. We characterize a unique equilibrium for a seller-initiating game, where either both buyer types accept the offer immediately, or only one type accepts immediately while the other rejects and counteroffers an acceptable contract. We apply our model to study the effect of demand forecasting accuracy on firm profitability.

SESSION 2 M4004
January 3, 2013 14:00 – 15:30

Behavioral OM
Session Chair: Juan Li (Nanjing University)

1. New Product Pricing Strategy in the Social Media Era

Xiaohang Yue (University of Wisconsin–Milwaukee)
Juzhi Zhang (University of Science & Technology of China),
Qinglong Gou (University of Science & Technology of China),
Liang Liang (University of Science & Technology of China),

Abstract: As social media becomes more popular, information on the price and quality related to a product is exposed to the public quickly, which makes consumers more susceptible to online word of mouth (OWOM) and reference price. This paper focuses on pricing strategy for new product introduction in the current social media era with a two-period pricing model. The derived optimal pricing decisions from our model spontaneously form three main pricing strategies: price skimming, constant price, and price penetration. We illustrate how firms should make the trade-off between OWOM and reference price when they determine their new product pricing strategies.

2. Time-based Competition with Benchmark Effects

Liu Yang (Tsinghua University),
Francis de Vericourt (INSEAD),
Peng Sun (Duke University)

Abstract: We consider a duopoly where firms compete on waiting times in the presence of an industry benchmark. The formation of the
benchmark is endogenous and depends on both firms' choices. When the benchmark is equal to the shorter of the two offered delays, we characterize the unique Pareto Optimal Nash equilibrium. Our analysis reveals a stickiness effect by which firms equate their delays at the equilibrium. When the benchmark corresponds to the average of the two offered delays, we show the existence of a pure Nash equilibrium. In this case, we reveal a reversal effect.

3. How Reference Points and Competition Effect Firms’ Price and Quality

Juan Li (Nanjing University),
Di Zhang (Nanjing University),
Houcai Shen (Nanjing University)

Abstract: Facing different products, consumers prefer to evaluate the value of one product by taking another’s as a reference point, and also exhibit bounded rationality in the evaluation of the products. The reference point may be the first product that consumers mention, and the firms usually want to become the reference point by advertising, sales promotion etc, in order to maximize its revenue. This paper investigates how reference points and competition impact firms’ operations decisions by modeling consumers’ choice behaviors with bounded rationality. The optimal prices and qualities are obtained, and the conditions under which firms should try to become the first firm mentioned by consumers are pointed out.

4. Social Network Sites, Self-disclosure, Social Capital, Personality Traits

Xi Chen (Zhejiang University),
Ci Yang (Xiamen University),
Shun Cai (Xiamen University)

Abstract: Recently, social network sites (SNS), such as Facebook, and Twitter, have attracted millions of users worldwide, many of whom have regarded visiting these sites as part of their daily lives. Microblogging, a miniblogging service in which users can write short posts that are made available to their friends via text messaging or Web surfing, is primarily used by people to talk about their daily activities, such as people’s daily lives, personal news stories, and other interests. This study seeks to identify factors influencing self-disclosure behavior in SNSs from a social capital perspective. Specifically, by investigating self-disclosure from five dimensions (amount, accuracy, intimacy, positiveness, and intentionality), we examine the influences of social capital (in terms of structural, relational, and cognitive dimensions) and personality on people’s self-disclosure in the context of microblogging. Our findings are expected to extend existing self-disclosure research to the SNS context, and contribute to the understanding of why users disclose intimate information about themselves in an environment that is highly prone to the invasion of privacy.

SESSION 2 M4051
January 3, 2013 14:00 – 15:30

Energy and Emerging Issues
Session Chair: Emre Berk (Bilkent University)

1. Sustainability and Risk Management for Critical Infrastructures

Chao Fang (City University of Hong Kong),
Min Xie (City University of Hong Kong)

Abstract: Sustainability is the responsible management of resource use and the capacity to endure. Critical infrastructures such as future energy systems, transportation systems, etc., face a growing complexity in terms of interdependent components/sub-systems and
potential risks. In this regard, we propose to introduce importance measure with respect to sustainability and develop models for modeling and analyzing risks in these complex systems. This scientific contribution towards building and maintaining sustainable and reliable critical infrastructures would play a significant role for the overall sustainability in the environmental, economic, and social dimensions.

2. Developing QFD towards sustainable product development

Hendry Raharjo Chalmers (University of Technology), Xie Min (City University of Hong Kong), Kwai-Sang Chin (City University of Hong Kong)

Abstract: In line with the challenge to create a product or service which not only makes financial profit, but also benefits the society and at the same time safe to the environment, we attempt to further develop the traditional Quality Function Deployment (QFD) methodology towards sustainable product development. A five-step QFD methodology based on product life cycle stage is proposed. It links customer needs to raw material selection, process planning, use, and end of life strategy. For each step, multi-criteria decision making tools are suggested to take into account the possible options together with the related actors’ interests.

3. Carbon Permit Contract Design and Technology Selection for a Manufacturer

Emre Berk (Bilkent University), Ülkü Gürler (Bilkent University), Sibel Sözüer (Zorlu Holding)

Abstract: We consider a manufacturer facing random demand for a product that needs to be made from multiple inputs. The production process results in carbon emissions as a function of the quantity produced. The manufacturer is allocated a certain amount of emission permits by a central authority; however, it can also purchase additional permits through future contracts or spot purchases. The manufacturer has the added option of technology improvements that result in reduced emissions. In this setting, we investigate optimal contract behavior and technology selection decisions. We provide analytical results and illustrative examples.

4. Strategic sourcing in the UK bioenergy industry

William Ho (Aston University), James A. Scott (Aston University), Prasanta K. Dey (Aston University)

Abstract: Successful supply chain management requires the management of a complex, multi-stakeholder, multi-criteria system. This paper applies the integrated quality function deployment and analytic hierarchy process (QFD-AHP) method for the inclusion of a wide group of stakeholder requirements into the biomass supplier selection process in the UK renewable bioenergy industry. The paper uses a mixture of literature review and semi-structured industry interviews to answer three research questions: which stakeholder groups are important when selecting biomass suppliers for the UK? What requirements are made by these stakeholders on the supply of biomass fuels and feedstocks? Which evaluating criteria are most important?

SESSION 2 M4053
January 3, 2013 14:00 – 15:30

Quality Control
Session Chair: João Chang Junior (Centro Universitário da FEI), Marcelo Leonildo Teruel (Centro Universitário da FEI)

1. New Products Reliability Evaluation Model

João Chang Junior (Centro Universitário da FEI), Marcelo Leonildo Teruel (Centro Universitário da FEI)

Abstract: A reliable product is one that fully realizes the functions it was designed for lifetime limit and without fail during this time. This paper presents an operational model for assessing the reliability of new products, anticipating the stages of production and release, which was applied to an electronic product to be launched in the Brazilian market. For this purpose, it was used accelerated lifetime tests with prototypes at different stages of New Product Development Process. As a final result it was obtained a product reliability improvement, a framework of after sales structure and a warranty period.

2. A Gradient Approach to Efficient Design of CUSUM Charts Under Uncertainty

Wenpo Huang (University of Macau), Lianjie Shu (University of Macau), Wei Jiang (Shanghai Jiaotong University)

Abstract: Traditional CUSUM charts are often designed to optimize the detection performance for a prescribed magnitude of mean shifts when monitoring the mean level of a process. However, the shift to be occurred in the future is often unknown. The actual shift size is very likely to be different from the pre-specified one. This paper concerns with efficient design of CUSUM charts for detecting process mean shifts with uncertainty. A fast and accurate algorithm based on the gradient method is developed for this purpose. Optimal design parameters are obtained and compared with the one obtained through simulations in literature. The gradient method is shown to provide more accurate and faster design of the CUSUM chart under uncertainty than using Monte Carlo simulations.

3. The Role of ABET Quality assurance in Identifying Engineering Education Deficiencies: A diagnostic tool

Ayham A.M. Jaaron (An-Najah National University), Farouq Halaweh, Basheer Shahin (An-Najah National University)

Abstract: The purpose of this paper is to investigate the role of ABET quality assurance program for engineering education in recognizing deficiencies in the educational process. A case study was conducted in one of the largest Engineering Faculties in Palestinian universities using student surveys, instructors assessment documents, and semi-structured interviews at different administrative levels. Results show that ABET quality assurance program allowed for the identification of conspicuous deficiencies in terms of students’ attainments, stakeholders’ satisfaction, safety instructions and educational process documentation. The value of this paper is that it attempts to incorporate the role of ABET as a quality assurance program with revealing educational process deficiencies to promote stakeholders satisfaction.

4. The Use of CUSUM Control Charts to Monitor Exercise and Hypertension

Shiou-yun Jeng (National Yunlin University of Science and Technology), Jing-Er Chiu (National Yunlin University of Science and Technology),
Chun-Wei R. Lin (National Yunlin University of Science and Technology)

Abstract: Due to the fact that high blood pressure builds up gradually, hypertensive patients may become habituated to their own blood pressure changes, making it difficult to monitor the condition on a daily basis. This study examined the use of CUSUM control charts to monitor average deviation of individual blood pressure, to determine the effects of exercise on hypertensive patients to reduce blood pressure. The results indicated that it can provide an effective indicator for patients, allowing them to understand their changes in blood pressure at home, exercise not only promotes body health, but also reduces life-threatening complications due to hypertension.

SESSION 2 M4023
January 3, 2013 14:00 – 15:30

Logistics
Session Chair: Amir Hossein Ansaripoor (ESSEC Business School),

1. A Multi-Stage Stochastic Programming Model for Managing a Sustainable Fleet Portfolio System

Amir Hossein Ansaripoor (ESSEC Business School),
Fernando Oliveira (ESSEC Business School)

Abstract: We study a fleet portfolio management problem faced by a firm deciding which vehicle to replace to its fleet. This article contributes to the literature on fleet replacement and sustainable operations by proposing a general decision support system for the fleet replacement problem using a multi-stage stochastic programming to account for uncertainty in the decision process. We validate the results by a real world case study.

2. Resource Sharing between Two Express Delivery Service Companies

Friska Natalia Ferdinand (Pusan National University),
Kap Hwan Kim (Pusan National University)

Abstract: The network design conceptual model and the strategic alliance model are proposed to facilitate strategic alliance among small and medium express delivery service companies. A strategic alliance among express delivery services is that two or more delivery services companies consent to a long term mutual beneficial agreement so as to realize some specific strategic goals, such as sharing the resources and capacity to provide a low cost and maximize the profit for each company. A multi-objective programming model and the solution procedure was developed based on co-evolutionary algorithm and also coded in matlab 7.0 with a numerical example.

3. Dynamic Resource Planning for Order Sortation in an Express Gateway: A Simulation study

Xiang TR Kong (The University of Hong Kong),
George Q Huang (The University of Hong Kong)

Abstract: Dynamic Resource planning in an express center is related to the problem of allocating limited resources (e.g., shoe sorters and picking operators) to tasks for certain optimized objectives. While the significance of sorting is increasingly recognized, the study to propose models more concerned with the multi-agent coordination among personnel, machines, and shipments in a given processing time window, remains largely an open question. In addition to the motivating case, this case study
presents a mathematical model of personnel-equipment assignment problem and an optimization-based simulation for disruptions management. A case study demonstrates how DRPS is customized in an express center to facilitate the operations and decision-making.

4. How to Catch Up a Delayed Journey

Chen Li (HKUST),
Xiangtong Qi (HKUST)

Abstract: Container vessels in liner shipping are operated on closed-loop routes following a pre-announced schedule. In practice, when a vessel is sailed on the sea, there are lots of uncertain disruptions which may delay a vessel from its original schedule. In this paper, we propose one real-time operations solution to overcome the consequence of a disruption by speeding up and/or port skipping. We approach the problem by nonlinear programming with certain structure results. We also develop an approximate algorithm and provide a method to estimate the error bound of the algorithm.

SESSION 2 M4024
January 3, 2013 14:00 – 15:30

Social Network
Session Chair: Shanshan Yang (Xiamen University)

1. Online Herd Behavior On the Perspective of Trust

Chuan-zhen Wu (Xiamen University),
Di Xu (Xiamen University)

Abstract: Herd behavior occurs in e-commerce market when the trust of a product can be built on the others’ behaviors, rather than the physics properties of a product. This work presents three studies examining herd behavior in electronic market. Firstly, we build a model of trust diffusion to explain the herd behavior. In the second study, we calibrate and validate our model based on the empirical analysis. The last study is made by computational experiments. We demonstrate the diffusion process in a complex network to examine the volatility and critical points. The result has the implications for managers and other related decision-makers.

2. The influence of local bandwagon effects on diffusion of innovation

Shanshan Yang (Xiamen University),
Di Xu (Xiamen University)

Abstract: In our study, Bandwagon effects are taken as a different kind of concept from network effects although most scholars consider they are the same thing. In our point of view, bandwagon effects are mainly caused by social compatibility while network effects are mainly caused by technology compatibility. Apple is a good example of bandwagon effects. We also find that consumers are basically influenced by people around, so we put forward with the concept of local bandwagon effects. The paper mainly focuses on studying the influence of local bandwagon effects on the diffusion of innovation.


Wei Zhang (Xiamen University),
Di Xu (Xiamen University)

Abstract: The new product launch is a critical stage of the innovation process. We focus on new product launch timing decision involving
product network externalities in a duopoly market. In this research, a multiagent simulation model is proposed for the proper launch timing decision in a highly uncertain and competitive market environment. The model generates a social network to describe the relationship between consumers and can depict the innovation diffusion process at an individual level.

4. Opinion leader deteing algorithm based Internet reputation management for microblog media

Deng Xiaolong (Beijing University of Posts and Telecommunications)

Abstract: With much more frequent Internet reputation cases in the dominate microblog medias such as Twitter and Sina Weibo, the government has realized that it is necessary to manage and control the information spreading in social network reflected in Twitter and Sina Weibo. Recently with the rapid increase of information in society activities, distributed information system engineering such as MapReduce based cloud computing distributed system is becoming more and more important in large scale social network data computing in emergency case management. In this article, a novel MapReduce based SNA (Social Network Analysis) system was proposed to execute parallel analysis computing for Microblog information monitoring in corporation of social responsibility and sustainability. According to independent identically distributed probability statistics of node Betweenness Centrality, a more efficient betweenness approximation computation method was proposed in this article in very large scale SNA graph from emergency case management with better accuracy.

SESSION 3 M4001

January 3, 2013 16:00 – 17:30

Green Supply Chain
Session Chair: Chien-Ming Chen (Nanyang Technological University)

1. Strategies to reduce supply-chain carbon missions: observations from practice

Chien-Ming Chen (Nanyang Technological University)

Abstract: Carbon emissions generated in the supply chain may constitute a significant part of the life-cycle carbon emissions of a product. The goal of this study is to explore the carbon-abatement strategies taken by companies that have implemented innovative changes to reduce carbon footprint in their supply chains. We analyze the direct and supply chain emissions data of over 900 U.S. firms’ between 2004 and 2008. We summarize the management practices adopted by the leading companies and describe the managerial implications. We also find that most companies have improved their carbon intensities but not their carbon emission quantities.

2. Optimization for Integrated Forward and Reverse Supply Chain Network

Shuo-Tsung Chen (Tunghai University), Huang-Nan Huang (Tunghai University), Sheng-Chieh Lin (Tunghai University), Li-Chih Wang (Tunghai University)

Abstract: This work aims at the optimization of integrated forward and reverse supply chain network consisting of single suppliers, production plants, one customer zone, reversal production plant, and secondary market. To obtain optimal solution, both objectives and their constraints are firstly divided into two matrix forms according to the number of the linear-
independent constraints. Then matrix-based Lagrange principle and singular value decomposition are applied to solve the optimization problem. An illustrative example is presented to verify the obtained optimal solution.

3. An Order Assignment Model for a Closed-loop Supply Chain System with Multi-plants

Li-Jong Su (Yuan Ze University)  
Yuan-Jye Tseng (Yuan Ze University)  
Shin-Huei Chiou (Yuan Ze University)

Abstract: For a green product life cycle, the activities in the forward supply chain may affect the activities in the reverse supply chain. Therefore, it is necessary to integrate the two to build a closed-loop supply chain system. Given the orders of ordered products, if there are multiple plants in the closed-supply chain system, the orders need to be distributed to the multiple plants in the system. In this research, a new model for assigning and distributing the orders to the multiple plants in a closed-loop supply chain system is presented. A particle swarm optimization model with a new encoding and decoding scheme is presented. The new model is developed to assign the orders to the available multi-plants under the constraints of capacity and capability and to achieve a minimized total cost objective. In this paper, an example product is illustrated. The test results show that the model and method are efficient and practical.


Hsiao-Fan Wang (National Tsing Hua University), Chang-Fu Hsu (National Tsing Hua University)

Abstract: Take-back legislation based on extended producer responsibility is critical to a company. Leasing makes remanufacturing operation more easily implemented, and it helps company in reducing the uncertainty in the quantity and time for the returned products. In this paper, we propose a mathematical model to tackle the reutilization planning problem under a closed-loop supply chain system with multi-product, multi-period and components commonality. Based on the demand, the objective is to find the optimal leasing price and quantities for the leased product at different leasing periods under the production capacity constraints. Finally, a numerical result is presented to illustrate the procedure and the validity of this model.

SESSION 3 M4003  
January 3, 2013 16:00 – 17:30

Supply Chain Management
Session Chair: Yongquan Lan (City University of Hong Kong)

1. How Firms Co-Brand: Principles of Effort Decision, Cost Allocation and Partner Selection

Yongquan Lan (City University of Hong Kong), Yanzhi Li (City University of Hong Kong)

Abstract: Co-branding as a prevalent marketing tactic to ally two or even more brands has received growing attention over the last two decades. However, the majority of the existing studies are empirical or experimental. In this work, we employ a Stackelberg differential game to examine the issues of participating brands’ effort level and related cost allocation. We show that self-branding is a basic branding
strategy that is a nonincreasing, continuous feedback policy of sales while co-branding is a supplementary tactic that is a nondecreasing piecewise constant function of sales. Depending on co-branding efficiency, partners may each share a part of co-branding cost, or sometimes, perhaps counterintuitive, one will indeed charge her partner. We demonstrate some extent seemingly contradictory claims about partner selection are actually consistent in our framework. Finally, we use two special cases to further illustrate the relationship between self-branding and co-branding.

2. Sharing Demand Information in Competing Supply Chains with Suppliers’ Cost Reduction Efforts

Quan (Jinghan) Tian (Hong Kong University of Science and Technology)
Albert Y. Ha (Hong Kong University of Science and Technology)

Abstract: We investigate the incentive for vertical information sharing in two competing supply chains, each consisting of one supplier and one retailer. The suppliers can take efforts in cost reduction. The retailers have private demand information and engage in Cournot or Bertrand competition. We show that information sharing benefits a supply chain if the marginal cost of effort is low. The retailers may have incentive to share information voluntarily, which is not possible when the suppliers do not invest in cost reduction. We fully characterize the equilibrium information sharing outcome when the supply chains are identical.

3. The Integrative Management of Global Sourcing Decision and Transfer Pricing in a Multinational Firm

Xiaopeng Zhang (The Chinese University of Hong Kong),
Vernon N Hsu (The Chinese University of Hong Kong),
Kaige Zhu (The Chinese University of Hong Kong)

Abstract: In this paper, we consider a global firm’s supply chain consisting of a supplying division and one or two sales divisions all located in different countries with various tax rates. Taking consideration of both demand uncertainties and tax rate, we maximize the entire supply chain’s expected after-tax profit through jointly determining the optimal sourcing quantity and the optimal TP for transferring them. By casting the problem in a stochastic global supply chain environment, some new behaviors and insights are captured under many supply chain structures, which is different from the existing results derived in accounting, economics, and supply chain management.

4. Improving logistics effectiveness of Chinese herbal medicine by using FMEA

Pai-Wen Lin (Takming University of Science and Technology)
Bai-Sheng Chen (Takming University of Science and Technology)

Abstract: The health effect of Chinese herbal medicine has been accepted by advanced countries in recent years. The supply chain of Chinese herbal form materials harvested, multinational transportation, storage to manufacturing process, the failed operations or poor environmental controls would affect the quality of materials and treatment effects. The objective of this research is to use the failure mode and effects analysis (FMEA) to analyze the potential operation failure. According to the risk priority numbers to decide the critical failure processes and deploy the improvement actions to enhance the supply chain effectiveness of Chinese herbal medicine.
OM and Marketing
Session Chair: Juan Zhang (University of Science & Technology of China)

1. The Influence of Fan Page Quality, Electronic Word-of-Mouth and Brand Image on Purchase Intention

Wan-Ru Sun (Takming University of Science and Technology)
Ying-Chien Hsiao (Takming University of Science and Technology)

Abstract: In recent years, more and more enterprises to establish their fan pages on facebook, in order to strengthen interaction and gathering the views of consumers. Our research used questionnaire survey to verify the influence of fan page quality, electronic word-of-mouth (eWOM) and brand image on purchase intention, and used SPSS and AMOS to analyze data. Our research found that fan page quality, electronic word-of-mouth and brand image all positively influence the purchase intention. That reveals the better fan page quality, electronic word-of-mouth and brand image will raise purchase intention.

2. Ingredient Branding Strategies in a Dynamic Supply Chain: Models and Analysis

Juan Zhang (University of Science & Technology of China),
Qinglong Gou (University of Science & Technology of China),
Liang Liang (University of Science & Technology of China),
Xiuli He (University of North Carolina at Charlotte)

Abstract: We consider an original equipment manufacturer (OEM) procures key components from component suppliers to produce a final product. The component supplier (she) may implement an ingredient branding strategy through her own advertising campaign using cooperative advertising program. We model the impact of marketing effort on the channel members' goodwill levels in a modified Nerlove-Arrow framework. We first consider a single supplier and then extend to the cases of two suppliers in which the suppliers are independent, allied and keep two brands and allied and keep one brand. Equilibrium subsidy rates and advertising efforts of the suppliers and OEM are derived.

3. Firms’ profits and consumer surplus when a retailer contemplates selling online

Yu Xiaowen (Peking University)
Zheng Xiaona (Peking University)
Su Meng (Peking University)

Abstract: The rapid development of information technologies has made it easier for the retailers to engage in online sales. As a consequence, online stores operated by traditional retailers have increased dramatically. This paper investigates how a retailer's channel choice may affect consumer surplus and firms' profits. We construct a price-setting game between a manufacturer, a Stackelberg leader, and a retailer who is considering adding an online venue to its existing channel structure. We show that when the online channel operating cost is low enough, the manufacturer chooses a wholesale price that induces the retailer to adopt a dual-channel strategy. In this case, both firms and consumers may be better off.
4. The Value of Bundling Strategy with Strategic Consumers
Guangyong Yang (Xiamen University),
Guojun Ji (Xiamen University),
Tieming Liu (Oklahoma State University)

Abstract: Strategic consumers tradeoff current purchase with waiting for clearance sales in order to obtain higher expected surplus, which aggravates the mismatching risk between capacity and demand. This paper evaluates the value of the explicit and the implicit bundling discount strategies to induce strategic consumer to purchase early. In the explicit bundling discount strategy, a seller offers a bundling price discount when a strategic consumer simultaneously purchases two products early; whereas in the implicit bundling discount strategy, the seller provides a cross market discount via a cross market alliance. We show that in the explicit bundling discount strategy, the seller’s profit is independent of the level of the bundling discount; in the implicit bundling discount strategy, both the seller and the partner’s profits are independent of the cross market discount level. Finally, we also find that strategic consumers behave more strategic (i.e., higher strategic waiting degree), explicit and implicit bundling discount strategies are more valuable when seller bundles more complementary products.

Jiye Xue (The Chinese University of Hong Kong)

Abstract: In this paper, we address a classical multi-period inventory problem where a retailer can replenish its inventory using inventory-based financing scheme. The retailer’s replenishment decisions depend on her on-hand cash, current debt and inventory level. The objective is to maximize the retailer’s expected terminal wealth at the end of the planning horizon. We derive structural properties of the optimal inventory and financing policies in ways that are useful to a business decision maker. Our research is expected to offer significant contributions to the currently very limited understanding of a company’s operations decisions with asset-based financing.

2. Integrating Inventory Replenishment and Trade Credit Policies in One-Warehouse-Multi-Retailers System
Yuanguang Zhong (South China University of Technology),
Mabel C. Chou (NUS Business School),
Chung-Piaw Teo (NUS Business School)

Abstract: In this paper, we develop a supply chain finance and inventory model to understand how trade credit terms affect a firm’s financing costs and inventory decision along the supply chain. In particular, we use the classical echelon inventory approach to synthesize the effects of trade credits in a one-warehouse-multi-retailers system. We obtain a simple expression for the total supply chain cost, and use a 2-dimensional randomized rounding algorithm to establish performance bounds for power-of-two type policies in this system. We use this basic model to generate numerous insights into pertinent issues in supply chain finance and inventory management. For instance, we show that longer credit terms from the external supplier may not
necessarily translates into longer credit terms for the retailers in some supply chain environments. Furthermore, we also study the impact on total supply chain cost if firms can leverage on their strong capital positions to secure better loan rates for their supply chain partners, and how this affects supply chain replenishment decisions.

3. The Project Management Importance to the Achievement of Financial Institutions Goals in Brazil

João Chang Junior (Centro Universitário da FEI), Diogo Ronza Bento (Centro Universitário da FEI)

Abstract: Nowadays, projects are more relevant for the implementation of financial institutions targets, being these companies’ environment highly complex and regulated. This paper demonstrates that exist associations between project success, project management maturity and organizational structure for project management. Secondly, it shows that most financial institutions have a corporate structure for project management. Finally, it proves the hypothesis: higher maturity level supports the project’s success, corporate structures for project management supports the project’s success, corporate structures for project management supports a higher project management maturity level. Qualitative instrument is used and data are analyzed using multivariate techniques such as correspondence analysis.

4. Real Option Exchange

Hao Gao (City University of Hong Kong)

Abstract: There has been a growing trend in some large manufacturing systems to use real option exchange as a mean to improve the supply chain coordination. However, many issues related to the real option exchange and its applications have not well studied in the literature. We develop real options exchange schemes and discuss on their performance implications. Some insights and new ideas will be proposed in aiming to benefit the total chain coordination and efficiency. A real case will also be discussed.

SESSION 3 M4053
January 3, 2013 16:00 – 17:30

Inventory Control
Session Chair: Quan Yuan (City University of Hong Kong)

1. Joint replenishment model in special case

Xu Xiaoya (Macau University)

Abstract: Inventory theory provides optimization models that to achieve trade-offs in managing the demand and supply through a supply chain. We will first consider a famous inventory model called joint replenishment problem(JRP). However, it is not fair to share cost when JRP is applied to group buying game. Thus, we introduce fair cost sharing model, and consider how to design a mechanism to allocate fair cost sharing between group buyers. Based on the characteristic of JRP and fair cost sharing model, we build a model of joint replenishment problem of fair cost sharing(JRP-CS). Then we investigate the relationship between them. Accordingly, we consider the price of stability and price of anarchy of JRP-CS model. With the proposed model, the fairness of sharing cost of traditional JRP can be improved significantly. Furthermore, we consider price of uncertainty on JRP-CS.

2. A remanufacturing system of perishable products with substitution
Guitian Liang (Lingnan College, Sun Yat-sen University),
Ke Fu (Lingnan College, Sun Yat-sen University)

Abstract: We consider a remanufacturing system with perishable products and two-way substitution. There are two streams of stochastic independent demands for the fresh product and the refurbished one, respectively. The production firm can acquire the used products from the customers and resell them as refurbished ones after remanufacturing. We formulate the problem as a stochastic dynamic programming problem. We characterize the optimal policy that simultaneously determines the production quantity and the remanufacturing quantity to maximize the total expected discounted profit.

3. Multimodularity and Structural Properties of Stochastic Dynamic Programs

Peiwen Yu (Hong Kong University of Science and Technology)
Qing Li (Hong Kong University of Science and Technology)

Abstract: We introduce the concept of multimodularity into the class of stochastic dynamic programs in which state and decision variables are economic substitutes. We discuss its properties and its relationships with supermodularity, convexity, and L-convexity in real space. We show that multimodularity is preserved under minimization and multimodularity leads to monotone optimal policies with bounded sensitivity. We use clearance sales of perishable goods, transshipment under capacity constraints, and lost-sales inventory systems as examples to illustrate its applications in stochastic dynamic programs.

4. Analysis of Supply Contracts with Total Minimum Quantity Commitment and Fixed Order Costs

Quan Yuan (City University of Hong Kong)

Abstract: We study a supply contract that specifies a minimum total (cumulative) order quantity over the planning horizon (e.g., one year). Each replenishment order incurs both fixed and variable costs. Introducing a new class of K-convex functions, we show the optimal policy to be of a modified (s, S) form.

SESSION 3 M4023
January 3, 2013 16:00 – 17:30

Logistics
Session Chair: Yiping Jiang (Southeast University)

1. The Analyses of China’s Railway Parcel Express from the Perspective of Logistics

Peng Yongzhao (Beijing Jiaotong University)
Lang Maoxiang (Beijing Jiaotong University)

Abstract: With the development of e-commerce in China, railway has the opportunity to obtain more profits. However, most delivery companies use air and road. In the background of the development of high speed railway in china and on the premise of convenience for customers, SWOT of Railway Parcel Express (RPE) and the demand of railway parcel market are studied. Then the author puts forward the new RPE products, including starting inter-city parcel express train and high-speed parcel train, and optimally using the existing high-speed train-set. This study also shows relative marketing strategies to guarantee the efficient execution of new RPE products.
2. A Bilevel Dynamic Storage Pricing Model for a Supply Hub in Industrial Park (SHIP)

Xuan Qiu (The University of Hong Kong),
George Q. Huang (The University of Hong Kong)

Abstract: A Supply Hub in Industrial Park (SHIP) is a third-party business entity that leases storage space and logistics services among manufacturers located in the same industrial park. Manufacturers may hire warehouses outside the park if SHIP’s storage price is exorbitant. This paper discusses how SHIP and manufacturers interact to optimize their decisions on storage pricing, replenishment and delivery. A dynamic storage pricing strategy depending on the duration of storage usage is adopted. This problem is modeled as a bilevel program where the SHIP is the leader and manufacturers are followers. A closed form solution to the problem is obtained.

3. RFID-Based Identification Tracking of Logistics and Integrated Real-time Information System

Qi Xu (Donghua University),
Zheng Liu (Donghua University)

Abstract: As the supply chain becomes more complex, identifying and tracking a certain product or pallet in supply chain based on RFID in a real-time manner has played an important role. Identification, locating, tracking and dynamic management on supply chain logistics by using RFID technology are focused on. Firstly, an innovative scheme for the identification of an individual physical object through Web service is presented. Then, an anti-collision framed slotted Aloha algorithm for the multiple tags simultaneously sensing is discussed. In addition, a selection sequence optimizing model by means of RFID is developed, and an example is shown to explain the model. Finally, an RFID-based framework of dynamic supply chain management system is presented. Thus, using RFID for the supply chain make the supply chain processes automatically verified and optimized operation.

4. Improved SPPC Algorithm for Convex Time Space Network Flow Optimization Problem with Application in Emergency Logistics

Yiping Jiang (Southeast University),
Xiaoling Fu (Southeast University),
Lindu Zhao (Southeast University),
Kai Huang (McMaster University)

Abstract: In this paper, we focus on solving a convex time space network flow optimization problem with application in emergency response to large scale disasters. We first introduce a joint optimization model which combined emergency resource allocation with emergency distribution scheduling, and transform it into a variational inequality problem. Next, according to the decomposable structure of primal decision variables, we follow the idea of self-adaptive projection-based prediction-correction (SPPC) algorithm, and propose an improved SPPC (ISPPC) algorithm to solve the model. Then, we further provide the convergent theory of ISPPC algorithm. Finally, we report the computational performances through numerical experiments, and we find ISPPC has more advantages in solving integrated optimization problems with decomposable structures.
Session Chair: Rowan Wang (University of Minnesota)

1. Managing Product Procurement and Inventory under Carbon Cap-and-trade

David Chen (University of Minnesota),
Saif Benjaafar (Singapore University of Technology and Design),
William L. Cooper (University of Minnesota)

Abstract: We consider decisions regarding product procurement, inventory control, and carbon trading that a firm makes when it is subject to a carbon cap-and-trade system. The firm faces both stochastic demand and stochastic carbon prices in each decision period. We characterize the structure of the optimal policy over a finite planning horizon for general demand and price distributions and inventory costs. We study the impact of carbon price volatility and show that, perhaps counter to intuition, carbon price volatility is always beneficial.

2. A Production Model with Multiple Inputs Under Carbon Emission Constraint and Stochastic Demand

Ülkü Gürler (Bilkent University),
Emre Berk (Bilkent University),
Sibel Sözüer (Zorlu Holding)

Abstract: In this problem, we consider a firm that decides on the production quantity and input quantities that will maximize its expected profit under a carbon emission restriction. We look at the production of a single item at a single production facility in a single period with stochastic demand. We provide the optimal production strategy and numerical results.

3. Stochastic Inventory Systems with Planning Horizon Ordering Constraints

Rowan Wang (University of Minnesota),
David Chen (University of Minnesota),
Saif Benjaafar (Singapore University of Technology and Design)

Abstract: We consider stochastic inventory systems with a constraint on how much can be ordered over the entire planning horizon. Under such a constraint, the ordering capacity in each period depends on the ordering decisions in previous periods and affects the ordering capacity available in future periods. We formulate the problem as a two-dimensional stochastic dynamic program. We then use an extended state space analysis to reduce the problem into one-dimensional and characterize the optimal policy. In addition, we characterize the impact of the ordering capacity constraint and discuss associated managerial implications.


Yu Xiaowen (Peking University),
Zhao Xinna (Peking University),
Lei Ming (Peking University)

Abstract: This paper aims to study the dynamic performance of energy-economy-environment by analyzing the impact of carbon emission on overall performance. Based on Directional Distance Function and SBM, this paper suggests a weighted directional Slacks-based measure accounting for dynamic factors. Dynamic factors are introduced into the traditional Global Malmquist-Luenberger index. To analyze the 3E dynamic total factor productivity and its sources, we decompose productivity growth into Dynamic Technology Efficiency Change (DTEC), Best Practice Gap Change (BPGC) and Dynamic Global Progress Change (DGPC). Using this approach the decomposition of change in China’s carbon emissions at the provincial level between the years 1998 and
2010 is studied. Furthermore, the results of Tobit regression analysis to investigate the determinants of the resulting index are presented. Based on this, some policy implications and suitable suggestions are proposed for policy makers.

SESSION 4 M4003
January 4, 2013 09:00 – 10:30

Supply Chain Management
Session Chair: Biying Shou (City University of Hong Kong)

1. Information Disclosure, Supplier Contracting and Capital Market Interaction

Fang Yaner (City University of Hong Kong), Biying Shou (City University of Hong Kong), Zhaolin Li (The University of Sydney)

Abstract: A firm’s demand forecast information is essential both to external investors who assess the firm’s interim share price and to the firm’s supplier that determines the wholesale price. We examine the interaction among the firm, the supplier and the capital market, and characterize 1) when it is worthwhile for the firm to acquire demand forecast information, 2) if the firm acquires information, when it would disclose or withhold it to the supplier and investors, and 3) what the impact is of the firm's information acquisition and disclosure decisions on the investors' and the supplier's pricing strategies.

2. Managing Operational and Financing Decisions to Meet Consumption Targets

Zhuoyu Long (National University of Singapore), Lucy Gongtao Chen (National University of Singapore), Melvyn Sim (National University of Singapore)

Abstract: We study dynamic operational decision problems with uncertainty. Financing decisions are available to smooth out consumptions with the goal of achieving prescribed consumption targets. Our target-oriented decision criterion has salient properties of subadditivity, convexity and respecting second-order stochastic dominance. We show that if borrowing and lending are unrestricted, it is optimal to finance consumptions at the target levels for all periods except the last; otherwise, the optimal policies correspond to those maximizing expected utilities. We also analyze the optimal policies of joint inventory-pricing decision problems under the target-oriented criterion and provide optimal policy structures.

3. How Prudence and Willingness-to-Pay Shape Price Trends in a Dynamic Pricing Model

Xiaowei Xu (Rutgers Business School, NJ)

Abstract: This paper studies a multi-stage dynamic pricing model, in which a state variable evolves as a stochastic process and affects customer demand at each stage. A firm has a limited amount of assets to sell and sets the price at each stage after observing the state variable. Borrowing the concept of prudence from the precautionary saving literature, we show that a concave (convex, linear) marginal revenue function implies the firm's prudent (imprudent, prudent-neutral) pricing behavior and an upward (downward, flat) price trend.

4. When Are Test Auctions Beneficial in Sourcing

Izak Duenyas (University of Michigan), Brendan See (University of Michigan), Damian Beil (University of Michigan)
**Abstract:** Entrant suppliers must undergo a costly qualification process prior to competing in a procurement auction. We evaluate when a buyer can benefit from holding test auctions when the supply base consists of both qualified incumbents and not-yet-qualified entrant suppliers who can be qualified at a cost. The buyer faces a trade-off between increased supplier competition and revealing supplier cost information. We extend the model to incorporate a credible reserve price and take it or leave it (TIOLI) offer. We characterize when such test auctions and reserve prices as well as TIOLI offers are beneficial.

**SESSION 4 M4004**  
**January 4, 2013 09:00 – 10:30**

**Revenue Management**  
Session Chair: Leon Kao (National Chiao Tung University)

1. **Portal Advertisement Scheduling with Different Banner Categories**

Leon Kao (National Chiao Tung University), B.M.T. Lin (National Chiao Tung University)

**Abstract:** With the number of web users continues to increase, banner advertisements constitute the main source of revenue to most website owners. Because of the limit of banner space, the website advertisement space should be price-differentiated to reflect the gazes from website visitors. How to obtain the optimal placement of advertisements is a major issue to the website owners. In addition, some advertisements have their time-effective factors for the reason that in particular dates the visitors may surf on the Internet to find some special goods or services. This article is dedicated to the design and implementation a heuristic algorithm and a tabu search algorithm for solving the portal advertisement problem with different banner categories.

2. **On Theoretical and Empirical Aspects of Marginal Distribution Choice Models**

Vinit Mishra (The University of Sydney Business School), Karthik Natarajan (Singapore University of Technology and Design), Dhanesh Padmanabhan ([24]7 Innovation Labs, India), Chung Piaw Teo (NUS Business School)

**Abstract:** Discrete choice models have become increasingly popular in Operations Management recently. Most papers in areas such as dynamic pricing, revenue management and assortment planning use Multinomial Logit Model (MNL) for demand functions since it has nice structural properties allowing one to find analytical solutions. We propose a more general class of choice models derived under limited distributional assumptions that has nice structural properties for multiproduct pricing problem. Further, several classical choice models such as MNL and GEV can be derived using this approach.

3. **Dynamic Priority Optimization Request Scheduling for Business Web Server Based on Reward-Driven Request Classification**

Chen Meimei (Donghua University)

**Abstract:** The target of request scheduling is to maximize throughput and minimize response time. But for a business web server with the goal of revenue generation, it is crucial to increase the completion rate of transaction related requests and requests from VIP. Aiming at the multi-object of request scheduling, the multi-dimension criterion for reward-driven request
classification is firstly presented. Then, reward-driven dynamic priority optimization scheduling mechanism is proposed based on it. The algorithm is also proposed based on one-step-ahead overload estimation in order to avoid the delay in control effect. Simulation experiment shows the validity of this scheduling algorithm.

4. The Application of Capacity Allocation Model in Radiology Department

Juanjuan Ji (Sichuan University), Li Luo (Sichuan University), Xiaoling Lang (West China Hospital)

Abstract: Capacity allocation, an important decision in revenue management, is applied in radiology department’s appointment management. Two class and multi class capacity allocation models are developed to minimize the total waiting costs of all patients in radiology department which is different from the conventional capacity allocation models to maximize the total revenues. The Littlewood principle is used to establish the two class capacity allocation model and the traditional EMSR-a model is used to formalize multi class capacity allocation based on the patients’ diversified waiting costs in consideration of the patients’ urgency degree. The models are used to analyze the radiology department’s capacity allocation with the data collected from China West hospital and to give the optimal protect level and allocation strategy.

1. Customer Lifetime Value Modeling in Semicontractual Setting

Rui Cai (Beijing University of Posts and Telecommunications), Jiayin Qi (Beijing University of Posts and Telecommunications)

Abstract: In the field of customer lifetime value modeling, some researchers had proposed the concept of "semicontractual setting" recently but without a consensus. In this paper, we first defined the semicontractual setting from the perspective of customer behavior characteristic, and then subdivide it according to the incomplete determinacy that customer behavior showed. We got seven qualified semicontractual sub-settings after subdivision and chose one of them for the customer lifetime value modeling. The model assumptions mainly included three parts: amount of consumption, survival duration and fluctuation of amount of consumption. Finally, we selected a corresponding telecommunication service for the empirical study.

2. Consumer Portfolio and Advertising Strategies for Conspicuous Product: A Mean-Variance Analysis

Chun-Hung Chiu (Sun Yat-sen University), Xin Dai (Sun Yat-sen University), Tsan-Ming Choi (The Hong Kong Polytechnic University), Jin-Hui Zheng (The Hong Kong Polytechnic University)

Abstract: We formulate a mean-variance advertisement budgeting model for a firm in a conspicuous market which consists of two consumer groups. We investigate the customer portfolio and the mean-variance exposure of the firm. Four scenarios are found under which the same budget allocation leads to different
portfolios. The efficient frontier for each scenario is explored whereas similarities and differences among the scenarios are discussed. There are two major differences between the findings derived from this model and the classical investment portfolio theory: 1. There are inferior budget allocations. 2. Diversification of consumer portfolio doesn’t always lead to a smaller variance.

3. Economics of Probabilistic Selling with Return

Chi-Leung Chu (National Chiayi University), Shih-Ming Ou (Chuang Hua University)

Abstract: Probabilistic selling is a marketing strategy in which a multi-item seller provides buyer with an option to purchase for less by accepting an uncertainty risk in getting a random item from a set of multiple distinct items. However, past studies on this strategy assume no return is allowed, partly because return policy will shift part of the mentioned uncertainty risk back to the seller. Since return policy is a common business practice and an important coordination tool in supply chain, this research will study the impacts of return policy on the effectiveness of probabilistic selling model.

4. The Influence of Brand Image, Sales Promotion and Service Convenience on Purchase Intention

Wei-Lun Jhang (Takming University of Science and Technology), Ying-Chien Hsiao (Takming University of Science and Technology)

Abstract: In recent years, various home delivery companies have launched promotional activities in winter and summer vacations for college students to seize market of Students baggage delivery. Our research used questionnaire survey to verify the influence of brand image, sales promotion and service convenience on purchase intention, and used SPSS and AMOS to analyze data. Our research found that brand image, sales promotion, and service convenience all positively influence the purchase intention. That reveals the better brand image, sales promotion, and service convenience will raise purchase intention.

SESSION 4 M4053

January 4, 2013 09:00 – 10:30

Inventory Control
Session Chair: Qingying Li (The Hong Kong Polytechnic University)

1. (s, S) Policy Revisited with Binary Search Algorithms, Near Closed-Form Solutions, and Economic Interpretations

Qingying Li (The Hong Kong Polytechnic University), Qing Ding (Singapore Management University), Pengfei Guo (The Hong Kong Polytechnic University), Chung-Lun Li, (The Hong Kong Polytechnic University),

Abstract: We consider a single-item continuous review inventory system with an objective of maximizing the long-run average profit. We assume Poisson demand and constant lead time, and we allow unsatisfied demand to be partially backlogged. We first analyze the special case with complete backlogging. We revisit this classical problem with a new approach. Specifically, the given average-profit-maximization objective is first transformed into a new objective which we refer to as the “effective profit.” The (s, S) policy is then shown to be optimal to the original problem and can be obtained through efficient binary search.
algorithms. Our approach also generates near closed-form expressions for the optimal reorder point, which can be nicely explained by a marginal cost-benefit analysis. We then extend our analysis to the general partial backlogging case and provide a well-performed heuristic.

2. Tradeoff Surface Analysis for Optimal Multiobjective Inventory Model

Ching-Shih Tsou (National Taipei College of Business)

Abstract: Classical inventory model, the Economic Order Quantity (EOQ), reveals that carrying inventory or ordering frequency follow a relation of tradeoff. For probabilistic demand, the tradeoff surface of annual order, expected inventory and shortage is useful in quantifying exactly what the firm must pay in terms of ordering workload and inventory investment to meet the customer service. This paper, firstly, presents a triobjective inventory model; then successive approximation is used to obtain efficient control policies outlining tradeoffs among conflicting objectives. The nondominated solutions generated by successive approximation are furthermore used to construct a tradeoff surface for inventory management. By utilizing the information coming from the tradeoff surface, deliberate decisions among conflicting objectives can be easily made. Quantitative analysis shows that the successive approximation approach provides managerial insights into improving the Multiobjective inventory management.

3. Non-instantaneous deteriorating items inventory model with varying demand and shortage under permissible delay in payment

Hui-Ming Wee (Chung Yuan Christian University), Chin-Jung Chao (Chung Yuan Christian University), Hindriyanto Dwi Purnomo (Satya Wacana Christian University), Wei Chuan Chen (Chung Yuan Christian University)

Abstract: Most commodities will deteriorate during storage. However, they will remain in their original quality for a certain period of time before starting to deteriorate. This phenomenon is known as "non-instantaneous deterioration".

4. Optimality on the Joint Decisions of Inventory Control and Advance Pricing Strategy

Ying Wei (Jinan University), Minghui Xu (Wuhan University)

Abstract: This paper studies an inventory control problem with pricing decision determined in advance. In each period, demand is stochastic and dependent on the selling price, which is determined at the previous period. Order replenishment is issued at sometime of the period and arrives at the beginning of the period followed, that is, delivery lead time is nonzero. With the objective to maximize the discounted total finite horizon profit, we show that a base stock list price type policy is optimal.

SESSION 4 M4023
January 4, 2013 09:00 – 10:30

Supply Chain Contract
Session Chair: Yat-wah Wan (National Dong Hwa University)

1. Performance of Weather-Conditional Rebates under Different Risk Preferences

Ozgun C. Demirag (The Behrend College)
Abstract: Seasonal product retailers face challenges in demand management due to weather uncertainty. To protect against adverse financial outcomes, retailers may offer weather-linked promotions such as weather-conditional rebates and induce customers to make early purchases. In this study, we extend the paper by Gao F., Caliskan Demirag O., and Chen F. POM, 21 (4): 778-794 (2012) to analyze the performance of weather-conditional rebates by explicitly considering the impact of different risk behaviors such as customers’ risk neutrality and the retailer’s risk aversion. We also conduct a simulation study to investigate how the customers’ alternative early-purchase behaviors influence the performance of the rebate program.

2. Quality and inspection decisions under imperfect inspection

Chung-Chi Hsieh (National Cheng Kung University), Yu-Ting Lu (National Cheng Kung University)

Abstract: This paper studies the strategic interaction between the manufacturer and its supplier in a decentralized supply chain, each with imperfect production and inspection processes. As the manufacturer’s and the supplier’s equilibrium decisions do not yield optimum chain profit, we develop a contract to coordinate their decisions in order to improve their individual's profits as well as the chain profit. We further investigate how inspection reliability affects coordinated chain profit and coordination performance. Our analysis reveals that coordination performance could vary significantly in response to small variation in inspection reliability.

3. A Vendor-Buyer Integrated Model under Production Uncertainty

Juhwen Hwang (National Dong Hwa University), Yat-wah Wan (National Dong Hwa University)

Abstract: This paper studies a single-vendor, single-buyer supply chain with random yield. Both players consider the fixed setup cost, the variable ordering cost, and the inventory holding cost, with the chain operated in the vendor-led mode, the buyer-led mode, or the integrated mode. In all modes, the vendor provides the buyer a new batch, possibly partial for being cut short by a random interruption, right when the buyer runs out of inventory. We find the optimal order quantities and conduct sensitivity analysis. Theoretical results are supported by numerical investigation.

4. Supply Chain Coordination for Dynamic Pricing Newsvendor Problem

Liu Yan (Nanyang Technological University), Srinagesh Gavirneni (Cornell University), Michael Z.F. Li (Nanyang Technological University)

Abstract: This paper studies the supply chain coordination for a dynamic pricing newsvendor with stochastic demand. We develop a stylized approach to analyze the channel contract for coordinating the dynamic pricing newsvendor supply chain system. A surprise result is the dynamic decentralized system could outperform a price-setting centralized system when the customer’s utility varying with time. Moreover, we show the coordination achieves a triple-win result compared to decentralized system. Numerical examples show the percentage improvement can achieve as high as 30% compared to decentralized system. Furthermore, dynamic pricing strategy could alleviate the competition between the supplier and retailer for decentralized system.
SESSION 5 M4001  
January 4, 2013 14:00 – 15:30

Pricing Optimization  
Session Chair: Houcai Shen (Nanjing University)

1. Earned Value Analysis and Application Based on Grey Control Chart

Feng Junwen (Nanjing University of Science and Technology)

Abstract: As it is common in project management context, Earned value analysis usually integrates time and cost performance within the project scope. It helps the project manager to understand how to deal with project from two points of view. The first is to recognize current performance indexes and the second one is to provide a forecast to the future. However, most of decisions in this regard have taken based on Schedule Performance Index (SPI) and Cost Performance Index (CPI) while there is no a well organized control mechanism in which detects their situations as it is, not only numerically but also recognize/categorize current situation of the earned value management system linguistically. In this paper a grey control chart approach associated with a-cut is presented in order to control earned value performance indexes including linguistics terms. Also a new application, based on a Multi Period-Multi Product (MPMP) production control problem is illustrated and successfully implemented.

2. Rental Pricing and Contract Design in Aircraft Leasing Business

Xiutian Shi (Nanjing University),  
Qing Ding (Singapore Management University),  
T.C.E. Cheng (The Hong Kong Polytechnic University)

Abstract: We study a problem of rental rate pricing and rental contract designing in aircraft leasing industry. In a framework of Stackelberg game, the system is composed of an airline and a lessor. The lessor announces daily rental rates and provides a long-term contract on a horizon with multiple periods. Identical rental rate is offered in the contract, if the airline promises to rent a pre-determined number over the horizon. The airline needs to decide whether to accept the contract at the beginning of the horizon. And for each period, the airline determines the leasing number, applying a dynamic ticket-pricing-policy based on seasonally stochastic demands. Both the lessor and the airline get benefit from an appropriate long-term contract.

3. Three pricing structures in a decentralized channel

Xue Weili (Nanjing University),  
Niu Baozhuang (Sun Yat-Sen University)

Abstract: In practice, retail price can be determined by either the manufacturer or the retailer. This paper analyzes the effect of retail pricing structures by considering multiplicative price-dependent demand and order postponement strategy, under which the retailer can postpone its ordering quantity decisions until the demand information is fully observed. We derive all the optima including the wholesale prices, the retail prices, the ordering quantities and the total expected consumer surplus. And interesting observations from these three structures are showed.

4. Optimal Production and Pricing Policy in a Make-to-Stock System Subject to Machine Breakdowns

Ting Wu (Nanjing University),  
Xiutian Shi (Nanjing University),  
Houcai Shen (Nanjing University),
Edwin Cheng (The Hong Kong Polytechnic University)

**Abstract:** We consider a make-to-stock system served by an unreliable machine that produces one type of product, which is sold to customers at one of two possible prices depending on the inventory level at the time when a customer arrives (i.e., the decision point). The system manager must determine the production level and selling price at each decision point. We show that the optimal production and pricing policy is a threshold control, which can be characterized by three threshold parameters under both the long-run discounted profit and long-run average profit criteria. Furthermore, the structural relationships among three threshold parameters are established.

SESSION 5 M4003
January 4, 2013 14:00 – 15:30

**Operations Management**
Session Chair: Miao Song (The University of Hong Kong)

1. **Process Flexibility Design Using Demand Variance Information**

Geoffrey A. Chua (Nanyang Technological University),
Shaoxiang Chen (Nanyang Technological University),
Zhiguang Han (Nanyang Technological University)

**Abstract:** We study the process flexibility design issue. To our best knowledge, the demand variance has been generally ignored in the literature. We investigate the effect of demand variance and present a simple variance-based method to construct good flexible structures that link several small chains together in a hub. Our numerical tests show that our method outperforms existing methods such as chaining and constraint sampling, in both computation time and structure quality.

2. **Sustainability and Competition for Limited Critical Resources**

Hsiao-Hui Lee (University of Hong Kong),
Manuel Nunez (University of Connecticut),
Jose Cruz (University of Connecticut)

**Abstract:** We develop a two-stage model to analyze different sustainability strategic decisions (e.g., starting a recycling program or developing alternative technologies) to replace limited critical resources. We find an optimal decision at each period; we investigate the impact of the parameters on the optimal decision; and finally, we show that under some minor assumptions of parameters, competition for resources encourages firms to be more sustainable. In addition, using a sample of firm-level data from COMPUSTAT and KLD dataset that describes firms' sustainability policies, we find empirical evidence that competition for is positively correlated with a firm's sustainability level.

3. **The Impact of Stochastic Production Learning and Strategic Customer Behavior**

Stephen Shum (Hong Kong University of Science and Technology),
Shilu Tong (University of New South Wales)

**Abstract:** We consider a firm who can reduce future cost through production learning, but faces uncertainty in the reduced cost. The firm decides how to price when selling to strategic customers. We show that production learning may not always be beneficial for the firm under dynamic pricing, but a higher uncertainty in
production learning always leads to a higher profit. While a firm can use price commitment or price matching to alleviate strategic waiting of customers, these pricing strategies provide less flexibility to respond to the uncertainty in cost reduction. We characterize conditions under which each strategy outperforms the other two.

4. Optimal Inventory Control with Financial Hedging under Stochastic Purchase Prices

Yi Zhai (The University of Hong Kong), Miao Song (The University of Hong Kong)

Abstract: This paper studies a multi-period stochastic inventory problem for a market-traded commodity with fluctuating purchase price. As derivatives of the same commodity are also traded in the financial market, along with the inventory decisions, the risk-averse decision maker simultaneously optimizes a portfolio of derivatives in each period to hedge the uncertainty in the purchase price. We prove that the optimal inventory control policy is a price-dependent base-stock policy. More specific properties of the optimal inventory and hedging policies are obtained when the purchase price follows a binomial tree process.

SESSION 5 M4004
January 4, 2013 14:00 – 15:30

Healthcare Management
Session Chair: Weifen Zhuang (Xiamen University)

1. Modeling of a New System for Scheduling Elective Surgery in a Hospital: a case study at Hospital São Paulo – UNIFESP

João Chang Junior (Centro Universitário da FEI), Priscila Prevedello Teixeira (Centro Universitário da FEI)

Abstract: Public health is a social problem that requires changes. Operational adjustments, managerial and organizational improvements result in ever greater assistance to the society. This research proposes a new system of elective surgeries scheduling in the surgical center of the São Paulo Hospital. We analyzed the average time of each surgery, considering the medical specialty and the patient's clinical status. After data collection and simulation, it was concluded that the cancellations are due to lack of planning and resources, such as equipment, medications and professionals. With proper scheduling of surgeries, the hospital would increase its occupancy rate at 43%.

2. Dynamic Resource Allocation for Health Care Service under Uncertainties

Cheng-Hung Wu (National Taiwan University), Doris Chou (National Taiwan University)

Abstract: This research proposes a dynamic resource allocation (DRA) model to improve operation performance of healthcare service. Unlike other service industries, social morality and fairness are important considerations in healthcare service. To balance the trade-off between social morality and service quality, the proposed DRA model dynamically allocates key resources to different customer classes. In our numerical study, DRA model significantly outperforms current industry practice and other resource allocation methods in literature. Sensitive analysis shows the robustness of DRA model under customer demand, cancellation, and no-show uncertainties.

3. Appointment Scheduling for Medical Diagnostic Facilities
Weifen Zhuang (Xiamen University),
David D. Yao (Columbia University),
Li Luo (Sichuan University),
Chunrong Qin (Sichuan University)

Abstract: Escalating healthcare cost, limited resources and burgeoning demand critically call for an effective and efficient appointment scheduling for medical diagnostic facilities, which are used to serve three patient segments: inpatient, outpatient and emergency patient. Inpatients and outpatients make appointment in advance while emergency patients walk-in directly. We develop a Markov Decision Processes (MDP) model for the appointment scheduling. We derive the structural properties of the value function and characterize the optimal policy. We also develop simple upper- and lower- bounds and study the asymptotics. Using the empirical data from the hospital, we conduct numerical studies to examine the asymptotics and evaluate the performance of heuristics.

SESSION 5 M4051
January 4, 2013 14:00 – 15:30

Operations Strategy
Session Chair: Xinping Shi (Hong Kong Baptist University)

1. Business Process Integration between Chinese Suppliers and International Business Partners in Global Supply Chains

Xinping Shi (Hong Kong Baptist University),
Ziqi Liao (Hong Kong Baptist University)

Abstract: This paper explores business process integration and operational performance of the Chinese suppliers in the context of global supply chains. We examine a conceptual model using the survey data from the Chinese managers who are responsible for logistics and supply chain management. The results show that inter-firm trust and interdependence considerably influence business process integration between the Chinese suppliers and their international counterparts. At the same time, business process integration mediates the impacts of inter-firm trust and interdependence on operational performance of the Chinese suppliers. The findings have managerial implications for strengthening strategic alliances in global supply chains.

2. On integration of strategy and business process in e-marketplace firms

Ryo Sato (Yokohama National University)

Abstract: One way to see a success in service innovation for B2B (business-to-business) e-commerce firm is to expand and deepen the miscellaneous knowledge of business so that the customer-companies can have a big benefit at low cost by using the service of the e-commerce firm. The point is in the integration of the service innovation strategy and business process. Through analysis and strategy formulation of three Japanese B2B e-marketplaces in respective industries, we will clarify what innovation strategies those firms have accomplished and how they have been developing the business processes with the strategies.


Ali Saboonchi (Morgan State University),
Oluseye Soyombo (University of Maryland - College Park),
Guangming Chen (Morgan State University)
**Abstract:** In large-scale projects, systems engineering approach can be applied to improve systems operation efficiency. There are a variety of projects consisting of many components and associated categories. These projects may range from designing a computer chip to designing a spacecraft. It is a real challenge to conduct these projects efficiently, especially when the project involves many people and many critical parts or subsystems. Systems Engineering provides the solution to this challenge. Researchers in the Department of Electrical and Computer Engineering at Morgan State University are developing a more advanced software defined radio (SDR) technology for space communication. NASA systems engineering process and SYSLM tools are used in the project to implement SDR technology development and design activities. Specifically, the team uses CORE software – a typical systems engineering software for space missions, to conduct the project, document requirements, develop context diagrams and help with the systems requirements review and design review. In this presentation, we will demonstrate the systems engineering application process to our SDR technology development activities.

5. Decision supporting model combined with smart grid for the application of mobile compound green power system

Wang, Yung-Ming (Minghsin University of Science and Technology),
Wu Der Jeng (Minghsin University of Science and Technology),
Fu-Lin Shen (Minghsin University of Science and Technology),
Wen Hsin Lee (GThink Technology Integration, Inc)

**Abstract:** Because the climatic change out of phase causes the environment destruction, the existing energy is facing the depletion. Various countries are accelerating to develop the energy alternative and take the environmental protection green energy as the development priorities. Therefore the Mobile Compound Green Power System (MCGPS), in which integrating various power generations such as solar energy, wind power, gas engine and city electricity, is developed by GThink Tech. Besides the Smart Grid is also designed in order to reduce damage caused by sudden accident power cuts and to avoid the isolated island impact. In this paper a decision supporting system is developed for matching MCGPS demand and planning, discuss the feasibility and future influences of using MCGPS, and analyze the influence that the terrain, climate, environment, power preferences and electrical storage capacity conditions through interview expert and using Analytical Hierarchy Process, and minimize the cost and risk using multiple objectives linear programming analysis to find suitable capacity of electricity storage size and combine the supply side smart grid power management system. The result of this research will provide to GThink Tech for MCGPS evaluation, and enhance the competitiveness of this technology around the world.

SESSION 5 M4053
January 4, 2013 14:00 – 15:30

**Vehicle Routing**
Session Chair: Weng Hei Tou (The Chinese University of Hong Kong)

1. Applying a two-stage heuristic algorithm to the vehicle routing problem of a cold-chain distribution center

Yu-Wen Chen (Takming University of Science and Technology)
Ku-Kuang Chang (Takming University of Science and Technology)
Abstract: It is interested in scheduling the food shipment in a cold-chain distribution center of a Taiwan chain restaurant. In the past, the vehicle routing problem (VRP) has been usually applied to describe the actual situation for many different industries. To improve the performance of the VRP, a two-stage algorithm, which based on the genetic algorithms (GA) combined with the K-means method for solving the VRP in our case, is proposed. This algorithm can produce more efficiency of the parameter estimation for the GA. The experimental results showed that the two-stage algorithm outperforms the simple GA in terms of total cost.

2. A Dial-a-Ride Problem for Public Transport Using Electric Vehicles

Weng Hei, Tou (The Chinese University of Hong Kong),
Janny M. Y. Leung (The Chinese University of Hong Kong)

Abstract: We study a variant of the Dial-a-Ride problem, using electric vehicles (EV), which aims to minimize the total distance travelled subject to meeting all customers’ requests, and constraints on capacity, time-window, ride-time and battery-charging restrictions. Using EV limits the travelling time between battery recharges. The battery-charging constraints complicate the problem as extra variables and constraints are introduced. Computational results and further research directions are discussed.

3. Local Container Drayage Problem with Tractor and Trailer Operating in Separated Mode

Zhaojie Xue (Shenzhen Graduate School – Tsinghua University),
Wei-Hua Lin (The University of Arizona),
Lixin Miao (Shenzhen Graduate School – Tsinghua University)

Abstract: In recent years, the local container drayage problem (LCDP) has received lots of attention in research as part of container transportation. This paper examines the LCDP under a special operational mode in which tractors and trailers can be separated, i.e., tractors can be assigned to a new task at another location while trailers are waiting for packing or unpacking. The problem is formulated as a vehicle routing and scheduling problem with temporal constraints. The resulting formulation can be used to solve small-scale problems. For large scale problems, we developed a max-min ant colony optimization algorithm to reduce the computation time. Our numerical examples indicated that the proposed algorithm is more efficient than the standard branch-and-cut method in Cplex for randomly generated instances.

SESSION 5 M4023
January 4, 2013 14:00 – 15:30

Supply Chain Contract
Session Chair: Hexin Wang (Beihang University)

1. Inventory Subsidy Contract and Manufacturers’ Shelf Space Competition

Hexin Wang (Beihang University),
Qiuhong Zhao (Beihang University)

Abstract: In some retail contexts, displaying a large inventory may stimulate demand. Manufacturers are therefore continuously battling for the retailer’s limited shelf space. This paper models the impact of inventory subsidy contracts on the shelf-space competition between manufacturers. We first investigate the scenario where one national brand manufacturer
competes with the private label controlled by the retailer. We analyze the condition that the national brand manufacturer would offer inventory subsidies and characterize the equilibrium shelf-space-allocation. We further study the supply chain with two independent manufacturers and their common retailer, and discuss the impact of inventory subsidies on the supply chain efficiency.

2. Joint Procurement through a Wholesale Price Contract under Stochastic Demand

Jiayan Xu (The Chinese University of Hong Kong),
Ke Fu (Lingnan College),
Vernon N. Hsu (The Chinese University of Hong Kong)

Abstract: Joint procurement is a commonly used inter-firm cooperation to reduce costs. In this article, we consider joint procurement between two retailers who procure product from the same supplier. The supplier offers a one-price-break incremental discount scheme to both retailers. The two retailers are facing independent stochastic demands. One retailer serves as the initiator who offers a wholesale price to the other retailer, and the other retailer serves as the follower who acts according to the initiator's decision. We study the optimal decisions and analyze some managerial insights. Finally, we discuss some extensions and that some basic insights still hold.

3. Ordering Strategy With Asymmetric Buy-Back Rate Information

Jianheng Zhou (Donghua University),
Vidyaranya B. Gargeya (The University of North Carolina at Greensboro)

Abstract: This article investigates the decisions to be made by the retailer characterized by buy-back contracts. We examine the retailer’s ordering strategy under the risk of a fluctuating buy-back rate. We discuss profits for retailers considering the risk fluctuations under three different situations depending on the symmetry and feedback information. If the retailer adjusts the ordering strategies based on the risk, then the profit of the retailer will be shifted to the supplier.

4. A Two-period Inventory Model with Remanufacturing Options

Xiaosong Ding, Jihong Zhang, Xian Li
(International Business School, Beijing Foreign Studies University)

Abstract: In this paper, we study a two-period model where the manufacturer produces only new products in the first period, but has the option of producing new, remanufactured, or upgraded products in the second period under the monopoly environment. Pricing decisions with respect to different types of products influence the system across two periods. It is assumed that the remanufactured and original products are indistinguishable in the second period. To encourage the consumers to return used products and buy new products, the manufacturer utilizes coupon for upgraded products. We focus on the analysis of the relationship among coupon, remanufacturing rate and pricing.

SESSION 6 M4001
January 4, 2013 16:00 – 17:30

Analytics
Session Chair: Jenny Tian (The Chinese University of Hong Kong)

1. Applying HBMO-based BPN in Predicting Taiwan Steel Prices
Po-Chou Shih (National Taipei University of Technology),
Chui-Yu Chiu (National Taipei University of Technology)

Abstract: This study uses the back-propagation network (BPN) to predict the Taiwan steel price and uses the honey-bee mating optimization (HBMO) approach to obtain suitable parameters for the BPN and to select beneficial subsets of features. The honey-bee mating optimization back-propagation network (HBMOBPN) is proposed with factor selection to predict the Taiwan steel price. The results were then compared with traditional BPN method. We found that the HBMOBPN forecasting system achieve more accurate steel price forecasts than the BPN.

2. The Effects of E-CRM Quality on Online Customer Ratings and Organizational Financial Performance

Jenny Tian (The Chinese University of Hong Kong),
Sophia Wang (National Dong Hwa University)

Abstract: We examined the effects of two important electronic customer relationship management (e-CRM) practices (e-mail service and company website e-CRM features) on organizational performance, measured from both customer and financial perspectives. In a sample of hotels operated in China, Hong Kong, Macau, and Taiwan, we found that e-CRM quality was negatively affected by low response rates to customers’ e-mail inquiries and low website interactivity. Moreover, e-mail response quality and website interactivity had a positive effect on hotels’ online customer ratings and financial performance. These results suggest that online sellers should strive to fully realize the performance-enhancing potential of their e-CRM practices.

3. Retail Supply Chain Coordination Forecasting Modeling

Wang Wenjie (Donghua University)

Abstract: Supply Chain Coordination is the basis of supply chain management. In this paper, a combination-forecasting model is proposed to coordinate the CPFR (Collaborative Planning, Forecasting and Replenishment) forecasting process between the retailers and manufactures in the supply chain. Furthermore, an error correction combination-forecasting model is discussed in order to improve forecasting accuracy. At the end, the formulation results showed the effectiveness of this combination-forecasting error correction model to coordinate the CPFR forecasting process.

4. Multilevel Reputation Effects and Risk Evaluation in Online P2P Lending: A Lenders’ Perspective

Wang Weihong (Donghua University)

Abstract: Online person-to-person (p2p) lending enable an individual to obtain unsecured loans from a collection of individuals without bank, and therefore the borrower’s transaction costs reduce but the lender’s risk increases in it. Using transaction data of ppdai.com and renrendai.com, We study the borrower-related determinants especially the borrower’s multilevel reputation effects on lender’s decision in p2p lending market of China, and a method of loan risk evaluation in p2p lending is presented in this paper as a decision aid of lender.
Simulation
Session Chair: Wheyming T. Song (National Tsing Hua University)

1. Empirical Modelling of Tail Behaviors

Weiwei Fan (The Hong Kong University of Science & Technology),
L. Jeff Hong (Hong Kong University of Science and Technology),
Xiaowei Zhang (Hong Kong University of Science and Technology)

Abstract: In the simulation field, performance measures often heavily depend on tail behavior. However, classic models usually focus on the central parts and hence fail to handle the tails well. In this paper, we propose an empirical method based on the self-similarity of tail distributions. Our method provides a convenient way to replicate tail sample and is effective to estimate the performances that are closely connected with tail behavior.

2. Pricing Path-dependant Options Driven by CGMY Process with Importance Sampling

Guangxin Jiang (Tongji University),
Chenglong Xu (Tongji University)

Abstract: In this paper, we consider Monte Carlo simulation to price path-dependant options driven by CGMY process, and use importance sampling to improve the simulation efficiency. Applying Esscher measure change in importance sampling, Newton iteration is employed to find the optimal parameters which make the variance of options minimize. By analyzing the properties of optimal parameters, a new method, function approximation method, is proposed to improve the computation efficiency in high dimensional problem. Numerical results are provided to show the effectiveness of our method. Moreover, this method could extend to price options driven by other Levy processes.

3. Kullback-Leibler Divergence Constrained Distributionally Robust Optimization

Hu Zhaolin (Tongji University),
L. Jeff Hong (The Hong Kong University of Science and Technology)

Abstract: We study distributionally robust optimization (DRO) problems where the ambiguity set of the probability distribution is defined by the Kullback-Leibler (KL) divergence. We show such DRO problems are often of the same complexity as their original stochastic programming problems and, thus, KL divergence appears a good candidate in modeling distribution ambiguities in mathematical programming.

4. Variance Reduction Techniques on Generating M/M/1 Processes in Simulation Output Analysis

Wheyming T. Song (National Tsing Hua University),
Mingchang Chih (Chung-Shan Institute of Science and Technology),
Samping Chuang (University of California at Los Angeles)

Abstract: Observations from steady-state M/M/1 processes are often used by simulation-methodology researchers conducting Monte Carlo performance evaluations of output analysis, variance reduction, and optimization. The classical method for generating data from M/M/1 processes requires two random number streams. Motivated by the need for variance reduction in simulation experiments, we propose inverse-transformation algorithms for generating M/M/1 processes, including waiting times in
queue (M/M/1-QT) or in system (M/M/1-ST), using a single random number stream. Moreover, we propose analytical results for computing the variance of the sample mean from M/M/1 processes. The proposed method for generating processes for the M/M/1-QT and the M/M/1-ST is superior (in terms of statistical effectiveness; i.e., variance reduction) to the corresponding classical methods using two random number streams. Moreover, the proposed generation method for M/M/1-QT is also superior to the classical method in terms of computational efficiency. Finally, although the proposed M/M/1-ST generation method is not as computationally efficient as the classical technique, it does have the same computational efficiency as the classical method if a parallel computing scheme is adopted with the Newton's search method.

SESSION 6 M4004
January 4, 2013 16:00 – 17:30

Scheduling
Session Chair: Hsien-Ming Lee (Minghsin University of Science and Technology)

1. Robot-less Operating Model Formulation and Simulation Analysis of TFT-LCD Factory

Hsien-Ming Lee (Minghsin University of Science and Technology),
Wu-Der Jeng (Minghsin University of Science and Technology),
Shang-Lin You (Minghsin University of Science and Technology),
Wen-Hsin Lee (GThink Technology Integration, Inc)

Abstract: The recent TFT manufacturing process is a straight production mode, lack of flexibility in machine organization and production rate. Long preparation time for setting machine cause unused waste. This paper is focusing on elevation of the utilization when Robot system is switch into Panel Handling System for panel factory on transport machine, sort machine and packer, change its transport way to save the unnecessary transfer time, and achieve the line balance. This paper is also making an efficiency assessment based on a virtual factory and in a whole plant planning view, focusing on TFT-LCD Array section, CF section, Cell section and Module section replaced from Robots into PHS system including PHS transport (PHS-T), PHS-Sort (PHS-S), PHS packer and un-packer(PHS-PUP). An experiment design based on throughput, waiting time and total production cost assessment is proposed to compare differences of PHS system and Robot Station.

2. Scheduling of Multi-skilled Staff Across Multiple Locations

Yong-Hong Kuo (The Chinese University of Hong Kong),
Janny M.Y. Leung (The Chinese University of Hong Kong),
Candace A. Yano (The University of California-Berkeley)

Abstract: We address the problem of assigning customer service agents of an airline to tasks related to departing flights at an international terminal of a large airport. We formulate the problem as a mixed integer program in which the objective account for both staffing shortages and skills mismatches. We extend the model to simultaneously optimize shift starting times and task assignments, which can aid in longer-term planning of shift starting times. We utilize our procedure to obtain managerial insights regarding the benefits of flexibility derived from more highly-skilled staff, allowing more
frequent moves, and choices of shift starting times.

3. Graph-based formulations for the Shift Rostering Problems

David S.W. Lai (The Chinese University of Hong Kong),
Janny M.Y. Leung (The Chinese University of Hong Kong)

Abstract: We investigate a ground-crew shift-rostering problem (SRP) --- the assignment of ground-crew to shifts over a planning horizon such that work-rules are observed. The work-rule constraints are expressed in terms of prohibited meta-sequences and resource constraints. When the number of staff and the number of feasible shift patterns are both large, straight-forward integer programming models could not solve the problem efficiently. We proposed a graph-based formulation where the size depends on the structure of the work-rule constraints. Preliminary result shows that the formulation could solve large instances to optimality in a few minutes.

SESSION 6 M4051
January 4, 2013 16:00 – 17:30

Manufacturing OM
Session Chair: Sy-Ming Guu (Chang-Gung University)

1. A Design for Assembly and Disassembly Model Using AHP and PSO Methods

Yi-Shiuan Chen(Yuan Ze University),
Yuan-Jye Tseng (Yuan Ze University),
Shin-Huei Chiou (Yuan Ze University)

Abstract: Given a product requirement, there may be several design alternatives for designing the same product. In the different design cases, the assembly and disassembly sequences for producing the product can be different. In this research, a new evaluation model is presented by using the analytic hierarchical process method to evaluate and rank the design alternatives based on the assembly and disassembly criteria. In addition, a new planning model is presented to concurrently evaluate the design alternatives and the associated assembly and disassembly sequences required for producing the designed products. As a result, the best designed product and its assembly and disassembly sequences can simultaneously be determined to achieve the cost objectives. The test results show that the presented models are feasible and useful for solving the integrated design evaluation and assembly and disassembly sequence planning problem. An example product is illustrated in the paper.

2. Optimal lotsizing problem for the serial production systems with Pentico’s Heuristic

Sy-Ming Guu (Chang-Gung University)

Abstract: Optimal lotsizing problems for a single stage production setup have been studied for decades. The uniform, binomial, and interrupted geometric (IG) distributed yields are three commonly seen models to capture the imperfect phenomena in production processes. It is known that the optimal lot size for the uniform/binomial case is greater than or equal to the size of outstanding demand while for the IG case the optimal lot size is less than or equal to the outstanding demand. In this manuscript, we investigate a two-stage production system in which a uniform yielded machine is in the first stage while an IG machine in the second stage. Under Pentico’s heuristic, we explore the properties for the optimal lot size of this production system.
3. A genetic algorithm based FFS to LED back end manufacturing process

Hsin-I Wan (Minghsin University of Science and Technology),
Wu-Der Jeng (Minghsin University of Science and Technology)

Abstract: In recent years, environment protection becomes a serious global topic. LED (Light Emitting Diode) is one kind of lighting with the characteristics of low consumption power, non-mercury, and long life operation time, which causes the LED industry to be more important as well as the rapid growth of LED lighting/back-lighting demand. A robust production plan and scheduling to meet the growth customer demand is the core competence of LED industry. The back end of LED manufacturing is belonged to one type of FFS (Flexible Flow Scheduling). Due to the different product specification and cutting manufacturing process, the operations limit machine flexibility and the scheduling problem becomes more complex. In this paper, a Genetic Algorithm based FFS is proposed to minimize makespan, in which production cycle is much more reduced as compare to traditional dispatching rules.

4. Product Design Postponement in a Duopoly

Tingting Xiao (The Hong Kong University of Science and Technology),
Albert Ha (The Hong Kong University of Science and Technology),
Stephen Shum (The Hong Kong University of Science and Technology)

Abstract: We investigate firms' product design postponement strategies in a duopoly. Facing two distinct customer segments, the firms are uncertain about the segment sizes but can observe them by postponing design. Postponement also allows a firm to enhance design which increases customer valuation. The firms need to balance the first-mover advantage with the benefits of postponement. We show that only one firm postpones design if the effect of design enhancement is low, the uncertainty of segment size is low and the asymmetry of segment size is intermediate. Otherwise both firms postpone design. We conduct sensitivity analysis and obtain some counterintuitive results.

SESSION 6 M4053
January 4, 2013 16:00 – 17:30

Service OM
Session Chair: Ziqi Liao (Hong Kong Baptist University)

1. E-Tourism Service Quality and Operations

Ziqi Liao (Hong Kong Baptist University),
Xinping Shi (Hong Kong Baptist University)

Abstract: This paper presents an empirical study of e-tourism service quality and operations. We develop a conceptual model and use structural equation modeling to test the survey data collected from individual consumers. The results confirm the reasoning from e-service quality, to customer satisfaction, to loyalty. The findings enrich the literature with a measurement scale of e-tourism service quality, which is manifested by website design, information quality, and information security. In addition, the findings have managerial implications for e-tourism service operations.

2. The Role of Supportive Climate on Service Innovation: An Empirical Study of Indonesian Service Sector
Wiwik S. Suhartati (PPM Institute of Management),
Erlinda N. Yunus (PPM Institute of Management)

Abstract: Service sector has been growing significantly in Indonesia, contributing more than 37% of annual GDP. The increasing customer demand, along with tighten market competition, put pressures on service firms to continuously improve their offerings in order to be sustainable and competitive. This study empirically examines the influence of supportive innovation climate, in terms of culture, leadership, and firm characteristics, on the degree of service innovation. Moreover, this study investigates the positive relationship between innovation and firm performance. Implications on research and practice are discussed.

3. Staff Scheduling of Multi-skill Call Center Considering Global Service Level

Tao Dai (Donghua University)

Abstract: Considering a typical “W” network, a multi-skill call center staff scheduling model based on integer programming was proposed. The model took the maximum of the global service level as the object. Focusing on the difficulty of multi-skill service level calculation, a method for describing state space was given first, then the state-transfer equation based on markov process was generated, and also an approximate service level solution using steady-state probability was presented. The numerical test given at last showed that the staff scheduling model considering global service level was much conformed to reality, and the model can be solved in a reasonable time.

4. Analysis and Optimal Design for A maintenance Service Contract

Lian Zhaotong (University of Macau),
Jinbiao Wu (Central South University)

Abstract: We study a novel maintenance model with a given type of service contract. Using a non-cooperative game formulation, both agent and unit owner make decisions by maximizing their expected profits to determine the agent's optimal pricing strategy, the length of warranty and the number of repairmen for a monopolist service agent providing the maintenance service. We found that the optimal length of warranty and the number of repairmen are independent of the warranty price functions. For fixed lifetime of the unit, the number of customers hardly affects the optimal length of warranty.

SESSION 6 M4023
January 4, 2013 16:00 – 17:30

Fuzzy Theory and Applications
Session Chair: Rakesh Verma (National Institute of Industrial Engineering (NITIE))


Rakesh Verma (National Institute of Industrial Engineering (NITIE))
Anand Jha (National Institute of Industrial Engineering (NITIE))

Abstract: For a country, resources are the key for development and among all these resources; water is one of the most precious resources. It is true that about 70% of earth’s surface is covered with water out of which only 2.5% is fresh water. Only 1% if total fresh water is accessible for direct human use. Water is the bloodline for an economy and also it is said that the next world
war will be fought for water only. Excess and
dearth both of this resource can jeopardize the
basic economic structure of a country and can
shift the orientation from growth to decay.
Hence it is imperative that the water resources
should be maintained and managed effectively
and efficiently and at the same time
Management of sustainable water resources
(MSWR) should be carried out. This Research
Paper throws light upon MSWR, analyzing it,
establishing evaluation indices and preparing a
hierarchy figure. This paper firstly identifies a
few indices (Rule base) which are critical for
MSWR and then identifies in what state or grade
that particular index is. To categorize these
indices into different grades, analytical hierarchy
process has been employed in which a number
of experts are interviewed and based on the
inputs given by them, a simple hierarchical
structure is formed to come up to definite
weights of different indices. As this technique
(AHP) involves human subjective evaluation,
Vagueness and Ambiguity are also introduced.
Hence a technique named as Intuitionistic Fuzzy
AHP or IF-AHP is used to handle both of these
problems. Thus as a result, we come up to
separate grades given to each index so that we
can take measures to correct the problem
according to the grades assigned.

2. FAHP-based Customer Satisfaction
Assessment Model for Third-Party
Logistics Enterprises

Shulin Lan (University of Hong Kong),
George Q Huang (University of Hong Kong)

Abstract: Service trading faces fierce
competition. The quality of logistics service has
a significant impact on the core competitiveness
of third party logistics enterprises. This paper
proposes a new evaluation model from the
perspective of customers and establishes a
customer satisfaction assessment system. The
model considers trading characteristics of third-
party logistics enterprises for formulating
customer satisfaction indices. The model
employs a Fuzzy Analytic Hierarchy Process
(FAHP) to quantify assessment indexes.

3. Bi-objective models based on mean-
semivariance for triangular fuzzy
portfolio selection

Haojian Zeng (South China University of
Technology),
Xue Deng (South China University of
Technology),
Xiaobin Zheng (South China University of
Technology),
Xiaoqiang Chen (South China University of
Technology)

Abstract: This paper mainly discusses portfolio
selection in the fuzzy environment. In this paper,
extpected value is used to measure the return of
portfolio whilst semivariance is to measure the
risk of portfolio. Further, when the rates of
return on investment belong to triangular fuzzy
membership function, we propose a mean-
semivariance bi-objective portfolio model,
namely, minimizing the risk and maximizing the
expected mean of the portfolio model. The
proposed bi-objective model will be solved by
two different ways, linearity weighted method
and ideal point method respectively. Finally, a
numerical example illustrates the effectiveness
of the proposed model and solving methods.
And the results of numerical example present
that the results of the ideal point are similar to
the one of linearly weighted method with some
fixed parameters.