

# CSUPOM 2020

## 32<sup>nd</sup> Annual Conference

**Growth Through Operations and Supply Chain  
Management – Economic, Social, and Environmental  
Prosperity**

**March 6-7, 2020**

**Fresno, CA**

**Hosted by**

The Craig School of Business  
Department of Marketing and Logistics  
California State University, Fresno



# CSUPOM

Consortium of **S**upply Chain & **O**perations **M**anagement

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**CSUPOM 2020**  
**The 32<sup>nd</sup> Annual Conference**  
**Growth Through Operations and Supply Chain Management – Economic,  
 Social, and Environmental Prosperity**  
***Friday, March 6th, 2020***

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**The Craig School of Business**  
**Department of Marketing and Logistics**  
**California State University, Fresno**

**Conference Chair**

Keith Story  
 California State University, Fresno

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Dr. Yang Sun – *JSCOM Editor-in-chief*, Sacramento State

## Welcome to CSUPOM 2020

On behalf of the Department of Marketing and Logistics and the Craig school of Business, it is our distinct honor and privilege to welcome you to the *32<sup>nd</sup> Annual CSUPOM Conference* at California State University, Fresno. This is the first time the conference has been held on the Fresno State campus, and we are excited to see colleagues from around the CSU family of universities and across the country. Thank you for joining us for this wonderful event.

Here in the Central Valley, we are seeing opportunity and growth due to developments driven by the desire of firms to improve and invest in their supply chain, operations management, and logistical capabilities. Best Buy, Amazon, Ulta Beauty, and JD Food are just a few of the companies that have invested in SCM/L capabilities around Fresno and the Central Valley. The growth of SCM/L in the region led to this year's theme: Growth Through Operations and Supply Chain Management – Economic, Social, and Environmental Prosperity. The area is seeing prosperity in several forms due to a more deliberate focus on the role of SCM/L in growing the economy, providing opportunities for working families, and increasing the sustainability of how companies are served all over the world. The tours and keynote speaker will provide insight on how the Central Valley is growing internally due to SCM/L and how the work here adds value around the globe.

Several people have been instrumental in putting this event together. I'd like to thank Susan Pheasant, Director of the Institute for Food and Agriculture, and the Jordan College of Agricultural Sciences and Technology for their invaluable assistance with our reception, use of facilities, and general support for our inaugural CSUPOM conference. Also, the support of Provost Saúl Jiménez-Sandoval, the Craig School of Business' Interim Dean Julie Olson-Buchanan, and Marketing and Logistics Department Chair Andy Stratemeyer made the effort much easier. I am grateful for the help received from Yang Sun, the Editor of the Journal of Supply Chain and Operations Management, in managing the peer review process, printing the journal, and maintaining the CSUPOM website. I must thank Eric Wickson and Kristin Sandoval from Ulta; Mark Ford from JD Food; and our keynote speaker from Olam, Adrienne Gifford. These companies supported this conference with their participation, and it has made all the difference.

I appreciate your participation in and support of the 32<sup>nd</sup> CSUPOM Conference. I hope you enjoy the tours, speakers, presentations, and most importantly, each other. Let's make this conference productive, thought-provoking, and rewarding for all participants. For those of you that are first-time visitors to Fresno, please enjoy your time here. We expect to see you again in the future!

# CSUPOM 2020

## The 32<sup>nd</sup> Annual Conference

**Growth Through Operations and Supply Chain Management - Economic,  
Social, and Environmental Prosperity**

***Friday, March 6th, 2020***

1:30 – 3:30	<b>ULTA Beauty Distribution Center Tour</b>	850 E Central Avenue, Fresno, CA 93725
2:00 – 3:30	<b>JD Food Tour</b>	4671 E. Edgar Fresno, Ca. 93725
4:00 – 9:00	<b>Evening Reception and Dinner</b>	Jordan Agricultural Research Center 5311 N Woodrow Ave Fresno, CA 93726

# CSUPOM 2020

## The 32<sup>nd</sup> Annual Conference

**Growth Through Operations and Supply Chain Management - Economic,  
Social, and Environmental Prosperity**

***Saturday, March 7th, 2020***

7:30 – 7:45	<b>Registration</b>	Vintage Room
7:45 – 8:00	<b>Welcome/Orientation</b>	Vintage Room
	Dr. Saúl Jiménez-Sandoval, Provost, CSU Fresno Keith Story, Conference Chair	
8:00 – 9:15	<b>Breakfast</b>	Vintage Room
9:15 – 9:30	<b>Coffee Break</b>	Henry Madden Library Rm 2206
9:30 – 11:30	<b>Session 1 Presentations</b>	
	Session 1A: Operational Implications	HML 2108
	Session 1B: Marketing and Business Applications	HML 3212
11:30 – 1:30	<b>Lunch</b>	HML 2206
	<b>Keynote Presentation:</b> Adrienne Gifford <i>Global Head of Corporate Responsibility &amp; Sustainability</i> <i>Olam Spices</i>	
	<b>Alan Khade Best Paper Award:</b> Presented by Zinovy Radovilsky	
1:30 – 1:45	<b>Coffee Break</b>	HML 2206
1:45 – 3:30	<b>Session 2 Presentations</b>	
	Session 2A: Pedagogy	HML 2018
	Session 2B: Operational Implications/Marketing and Business Applications	HML 3212
3:30 – 5:00	<b>Closing Reception and Business Meeting</b>	Vintage Room

### Session 1A: Operational Implications

<b>Session Chair:</b>	<b>Fang Fang</b>	<b>California State University, San Marcos</b>
Balaraman Rajan	California State University, East Bay	Does HIT deliver on its Promise? A Case of Pennsylvania Hospitals
Fang Fang	California State University San Marcos	Minimizing Response Time of IoT-Based Traffic Information System Through A Decentralized Server
Jia Guo	California State University, East Bay	Modeling and Control of a Solar-heated Greenhouse with Auxiliary Heat Pump
Peiyun Yu	Guangzhou University, Guangdong, China	A System Dynamics Modelling for Transportation and Storage: Case study of Regional Pork in China
Kelly Shi	San Jose State University	Organizational Efficiency in Autism Treatment Private Sectors: A Survey Study

### Session 1B: Marketing and Business Applications

<b>Session Chair:</b>	<b>A. William Musgrave, Jr</b>	<b>San Jose State University</b>
Steve Peng	California State University, East Bay	Triple Bottom Line Analysis of Water and Energy Conservation in A LEED Platinum Project
Mohit Ahuja	California State University, Northridge	Application of Blockchain for Supply Chains
Ming Zhou	San Jose State University	Open Innovation and Supply Chain Management for Small and Medium Size Businesses
Sam Wood	Responsive Learning Technologies	What Students Should Learn about Purchasing and Sourcing: Revelations from the Sourcing Game
A. William Musgrave, Jr	San Jose State University	A Theoretical Model of the Patterns and Drivers of Born Global Entrepreneurship: The Entrepreneur's Global Value Chain

### Session 2A: Pedagogy

<b>Session Chair:</b>	<b>Xun Xu</b>	<b>California State University, Stanislaus</b>
Helman Stern	Ben Gurion University of the Negev, Israel	Daily Aircraft Maintenance Routing Using a Deficit Function Hollow Graph
Zinovy Radovilsky	California State University, East Bay	Data Mining in Business Education: Exploratory Analysis of Course Data and Job Market Requirements
Xun Xu	California State University, Stanislaus	An Investigation of Altamont Pass Commuters' Perception and Behavior: A Longitudinal Analysis of Changing Process
Joseph Taylor	California State University, Sacramento	Understanding Diversity in Technology Leadership: Exploring the Characteristics of Firms with Powerful Female Technology Leaders
Zinovy Radovilsky	California State University, East Bay	Data Envelopment Analysis and Software Packages for Measuring Building Energy Efficiency
Evander Herrera,	California State University, Dominguez Hills	Effectiveness of Handling Risks in IS Development – An Analysis of 50 Cases

### Session 2B: Operational Implications/Marketing and Business Applications

<b>Session Chair:</b>	<b>Y. Helio Yang</b>	<b>San Diego State University</b>
Yuan Ye	California State University, Sacramento	Managing Service Outsourcing in Healthcare: A Comparative Study
Jaydeep Balakrishnan	California State University, Sacramento	Supply Chain Relational Capital and the Bullwhip Effect: An Empirical Analysis Using Financial Disclosures
Jyotishka Ray	California State University, East Bay	Bargaining Over Data with Consultant as a Gatekeeper
Y. Helio Yang	San Diego State University	National Drug Shortage Impacts on Medi-Cal

Jeffery Anderson

California State University, Los Angeles

Political Marketing as a Potent Tool for Product Diversification



**Adrienne Gifford**

**Global Head of Corporate Responsibility & Sustainability, Olam Spices**

Adrienne is responsible for developing and delivering the sustainability strategy across the Olam Spices global business comprised of more than 20 supply chains in 14 sourcing and processing countries. In 2019, she received the Olam International Shared Value Award for Integrity and the USA Annual One Olam Country Award.

Prior to joining Olam, Adrienne was an independent consultant and Vice President of the Initiative for Global Development in Washington, DC. She led impact assessments of sustainable agriculture and economic empowerment initiatives for organizations including USAID Feed-the-Future programs, The Rockefeller Foundation's Yieldwise Initiative, and Chevron's \$95M corporate social enterprise – The Partnership for the Niger Delta (PIND). She also consulted to numerous international development organizations including the Bill and Melinda Gates Foundation, the United Nations Foundation, World Vision International, and the U.S.-Mexico Foundation.

From 2002-2012, she worked in the Department of Defense and National Security industry supporting the U.S. Navy, the Defense Intelligence Agency, and the National Geospatial Intelligence Agency as a management consultant for both Booz Allen Hamilton and Herren Associates.

Adrienne was a 2019 Resnick Aspen Action Fellow, a 2014 U.S. Department of State Fellow in Entrepreneurship to Turkey, a 2013 Yunus Social Business Colombia Fellow, and is an AmeriCorps alumn. She holds an M.A. in Social Enterprise from the American University School of International Service and a B.S. in International Finance from the Kogod School of Business.

## **About Olam**

*Olam is leading, global B2B food and agri-business operating in 70 countries and supplying a broad portfolio of products to nearly 20,000 customers worldwide. Olam grows crops in its own orchards and plantations, and sources from 4.8 million farmers globally each year. Established in 1989, and listed on the Singapore Stock Exchange, Olam employs 74,500 full-time, seasonal, and contract employees and enjoys a global leadership position in many of its businesses including Cocoa, Coffee, Cotton, Edible Nuts, and Spices.*

<b>Session1A</b>	<b>Operational Implications</b>
<b>Location</b>	<b>Henry Madden Library Rm 2108</b>
<b>Time</b>	<b>9:30 – 11:30</b>
<b>Session Chair</b>	<b>Fang Fang, California State University, San Marcos</b>

### **Does HIT deliver on its Promise? A Case of Pennsylvania Hospitals**

*Dinesh R Pai, Pennsylvania State University*

*Subhajit Chakraborty, Coastal Carolina University*

*Balaraman Rajan, California State University, East Bay*

This study examines the relationship between health information technology (HIT) and patient care characteristics for Pennsylvania acute care hospitals. Specifically, we examine the impact of HIT functionalities such as electronic health record (EHR) and health information exchange (HIE) on quality of care measures such as risk-adjusted mortality and risk-adjusted readmission rates; hospital efficiency measures such as cost per inpatient day and cost per inpatient admission, and patient flow measure such as average length of stay. Our findings indicate only some evidence for the impact of HIT and the conclusions point to a mixed bag for the role of IT. While we find evidence for efficiency (lower costs) improvement associated with HIE, EHR seems to increase costs. HIE also seems to adversely impact patient care and patient flow indicators. Additional large studies may be needed to evaluate the effect of HIT, on hospital efficiency and quality of care measures.

### **Minimizing Response Time of IoT-Based Traffic Information System Through A Decentralized Server System**

*Maryam Hassanlou, California State University, San Marcos*

*Yi Sun, California State University, San Marcos*

*Fang Fang, California State University, San Marcos*

Many metropolises seek to relieve traffic congestions and reduce vehicle accidents by implementing intelligent traffic information systems. These systems manage continuous communication between vehicles, various roadside Internet of Things (IoT) devices and central servers in real time for traffic control and vehicle guidance and navigations. Short response time is critical to the success of these time-sensitive systems. For a small area, a system with centralized server architecture may just work fine. For a larger area with more IoT devices and traffic to manage, however, the system may experience excessive response time as a result of increased network distance and constrained server processing capacity. In this paper, we propose a decentralized server system to properly manage and reduce service response time. We also develop a binary nonlinear constrained programming model, and numerical results are provided using the MATLAB MINLP solver to support the proposed model.

### **Modeling and Control of a Solar-heated Greenhouse with Auxiliary Heat Pump**

*Jia Guo, California State University, East Bay*

We investigate the energy utilization strategy of an experimental solar-heated greenhouse that equips with 70 flat-panel solar thermal collectors. The greenhouse is designed to operate with an auxiliary heat pump system, which uses electricity to back up the solar input insufficiency during the night or through low-solar-radiant weather. Our work focusses on developing a control mechanism that can minimize the usage of electricity or other fossil-fuel energy based on optimization methods. The main contribution of this control system is that the control mechanism can adapt to future changes of heat loss, solar energy supply, and coefficient of performance (COP) of the heat pump using weather forecast information, such

as ambient temperature and solar radiation. The numerical results show that our optimal dynamic control mechanism can reduce 15~20% of the cost to operate an auxiliary heat pump while providing adequate energy supply to support greenhouse production.

### **A System Dynamics Modelling for Transportation and Storage: Case study of Regional Pork in China**

Ruhe Xie , Guangzhou University, Guangdong, China

Peiyun Yu, Guangzhou University, Guangdong, China

This paper studies and compares two kinds of pork supply chain models in China – large-scale specialized pig farm model and home-based family feeding pig model. We use the system dynamics approach to examine the efficiency of the pork supply chains with considerations of transportation, inventory, quality, local demand and supply capacity, as well as external and internal fluctuations. The results show that: (1) Information delay and macro-regulations by the government have larger impact on the family feeding model; (2) The major trade-off of the pork supply chain is between transportation and inventory control, and the balance of the trade-off can be achieved in certain range of system parameters.

### **Organizational Efficiency in Autism Treatment Private Sectors: A Survey Study**

*Sharon Qi, San Jose State University*

*Kelly Shi, San Jose State University*

*Iris Quan, San Jose State University*

*Taeho Park, San Jose State University*

The autism insurance reform in private sectors finally took off in 2006 when the Congress passed the Combating Autism Act. According to Autism Speaks (2017), 47 out of 50 states have passed legal mandates with different mandated coverage scope including ABA treatment. This study investigates 1) what are the current operational challenges and opportunities that autism intervention organizations are facing, especially after autism insurance reform; 2) How the service quality is managed at autism intervention centers to meet the operational challenges. The study is conducted through research survey, via phone calls for part 1 (office manager or staff), and via email blast for parts 2 and 3 (the interventionists and their supervisors). We have collected about 50 phone survey responses for part 1 and about 800 email blast responses for parts 2 and 3. The initially collected data appears very interesting and indicates that the biggest challenges are insurance billing and service quality control. Many best practices in the operation management process are reported. This study is the first large-scale study to investigate the insurance impact on autism treatment services and also on autism treatment organization's operational efficiency. The results will provide valuable insight to this type of mental health services improvement, and also will enrich mental health service-related organizational behavior management research.

<b>Session1B</b>	<b>Marketing and Business Applications</b>
<b>Location</b>	<b>Henry Madden Library Rm 3212</b>
<b>Time</b>	<b>9:30 – 11:30</b>
<b>Session Chair</b>	<b>A. William Musgrave, Jr, San Jose State University</b>

### **Triple Bottom Line Analysis of Water and Energy Conservation in a LEED Platinum Project**

*Steve Peng, California State University, East Bay*

This paper applies Triple Bottom Line (TBL) analysis to evaluate the benefits of water and energy conservation in a LEED (Leadership in Energy and Environmental Design) Platinum building project. This TBL analysis considers Economic (Profit), Environmental (Planet), and Social (People) perspectives. The results show obvious economic benefit from water conservation with a payback period within 3.5 years. The environmental and social benefits of water conservation also include enhanced agricultural production and improved life quality. However, due to a high initial cost of insulation and energy-saving equipment, the net present value of energy conservation enhancement remains significantly negative after a building's lifespan. To support energy conservation measures in a green building project, there must be sufficient incentives to help solicit the associated environmental and social benefits. Efforts and initiatives from public policies are necessary to support the continuous advancement of energy-conservation technologies developed and applied to future green building projects.

### **Application of Blockchain for Supply Chains**

*Mohit Vijay Ahuja, California State University Northridge*

Transparency plays a major role in order to implement an efficient supply chain. Application of Blockchain would benefit Supply chain by reducing costs, time and building immutable transactions between the key actors of an industry. IBM developed a cloud service where companies can build a blockchain network on open source Hyperledger Fabric platform. IBM Blockchain Platform heavily focuses on track and trace for all the industries in the world. The following research focusses on Blockchain, it's working, types, and key participants involved in the network. It describes two applications namely IBM Tradelens and IBM Food Trust for maritime and food industry respectively.

### **Open Innovation and Supply Chain Management for Small and Medium Size Businesses**

*Taeho Park, San Jose State University*

*Tianqin Shi, San Jose State University*

*Ming Zhou, San Jose State University*

*Shu Zhou, San Jose State University*

Open source is a common practice in the software industry. The concept has been applied in various other industries and gained noticeable results for businesses. Open innovation practices resort to an open community and external sources for novel ideas and cutting-edge technologies. Innovation is then no longer an internal affair. It is easily understandable that this concept can be helpful for R&D. But a business is more than just R&D and innovation is not limited to only technological development. Business processes, such as supply chain management, can also use new ideas to innovatively tackle important business problems. In this research, we interviewed more than seventy small and medium size businesses (SMEs) in Korea. Our interviews focused on these SMEs' perspective of open innovation in their supply chain management. Our results provided very interesting insights on adoption of open innovation and areas of application of open innovation in supply chains. To the best of our knowledge, this is the first research that studies open innovation of SMEs' supply chains.

## **What Students Should Learn about Purchasing and Sourcing: Revelations from the Sourcing Game**

*Sam Wood, President, Responsive Learning Technologies*

The Sourcing Game is a competitive online simulation where teams of students produce inventory, buy and sell inventory through purchase agreements with other student teams, and sell inventory to a retail market in a monopoly setting. Three years of experience from use in courses reveal common challenges for students: purchase agreements do not maximize the source's and retailer's joint efforts, leaving "money on the table"; teams take too long to form agreements while potential customers are lost; sources unintentionally price at a loss; teams neglect opportunities to expedite shipments to increase sales; sources overextend their capacity; sources stock out due to unanticipated demand from retailers; retailers stock out due to poorly chosen reorder points; and retailers choose customer prices that do not maximize profit. After an overview of the game, examples of these challenges in actual games will be presented, along with recommendations for addressing these challenges in lecture or course materials.

## **A Theoretical Model of the Patterns and Drivers of Born Global Entrepreneurship: The Entrepreneur's Global Value Chain**

*A. William Musgrave, Jr., San Jose State University*

Development. It was a 7-step model for born-global entrepreneurial success. The model had evolved from the author's experience in working with entrepreneurs in Silicon Valley and in Asia, Europe, Latin America, and the Middle East. Today, while there is somewhat of a political pendulum trending away from globalization toward nationalism and populism, there is also a born global entrepreneurial force that represents an evolving undercurrent for a more integrated and interdependent world. Many countries and regions are investing in entrepreneurship as a key driver of economic progress. These venture development regions are fostering programs and nurturing ecosystems that encourage and support home grown entrepreneurs, but also attract entrepreneurs from around the world.

This research will use the 7-step framework of The Entrepreneur's Global Value Chain (idea, talent, technology, environment, product, scalability, and market). The goal is to identify the trends and forces in born global entrepreneurship. At the start of the research, what we now know is that technology advancements in cloud computing, the internet, mobile communications, and the temporary office industry have made it far easier to operate virtually and flexibly around the world and at far less expense than was the case at the start of the internet in the 1990s. In particular, there have been many changes since the 7-step global entrepreneurship model was developed.

We also know that there are more regions of the world that are working to develop their own "Silicon Valley's" and build ecosystems to attract entrepreneurs from around the world. Finally, we know that there is a rise in entrepreneurship education and programs in developing countries and emerging economies as a foundational underpinning for both local and global entrepreneurs. The goal of the research is to not only gain insights into important global entrepreneurship trends but, most importantly, to see where there are program investment areas that can catalyze even more global entrepreneurship and more country-to-country program collaboration.

<b>Session 2A</b>	<b>Pedagogy and Operational Implications</b>
<b>Location</b>	<b>Henry Madden Library Rm 2108</b>
<b>Time</b>	<b>1:45 - 3:30</b>
<b>Session Chair</b>	<b><i>Xun Xu, California State University, Stanislaus</i></b>

### **Daily Aircraft Maintenance Routing Using a Deficit Function Hollow Graph**

*Helman I. Stern, Ben Gurion University of the Negev, Israel*

*Robert M. Saltzman, San Francisco State University*

This paper is concerned with the aircraft maintenance routing problem (AMRP), which determines rotations for each aircraft in a homogeneous fleet for a repeated daily flight schedule. These rotations should be maintenance feasible routes, meaning that each aircraft undergoes a maintenance operation over fixed intervals of time. Our formulation is based on a flight connection network that uses a polynomial number of variables and constraints. We develop a new, more compact connection graph referred to as a “hollow graph.” Connection opportunities are derived from a deficit function representation of the flight schedule. Deficit functions, found for all terminals, are stepwise functions which have a unit increase (decrease) for each aircraft departure (arrival). They allow a determination of the number of aircraft routes that start and end at each terminal, eliminating the need for a plane count constraint. We solve the AMRP using a dual objective multicommodity integer linear program.

### **Data Mining in Business Education: Exploratory Analysis of Course Data and Job Market Requirements**

*Zinovy Radovilsky, California State University, East Bay*

*Vishwanath Hegde, California State University, East Bay*

*Leena H. Damle, California State University, East Bay*

The Data Mining (DM) subject is increasingly incorporated into business programs as a response to the growing demand for data analytics skills. The academic response to DM teaching has been wide-ranging and evolving because of the interdisciplinary nature of the DM subject. In this research, we identify and systemize contents and skills of DM teaching. We compare and contrast DM courses from various layers of business education. We also compare contents and skills of DM courses with job market requirements in business data analytics and identify their similarities and differences. Overall, this research presents a framework for designing DM courses that are aligned with the market needs.

### **An Investigation of Altamont Pass Commuters' Perception and Behavior: A Longitudinal Analysis of Changing Process**

*Gökçe Soydemir, California State University, Stanislaus*

*Orestis Panagopoulos, California State University, Stanislaus*

*Xun Xu, California State University, Stanislaus*

With the development of economy, increase of living expenses, and more employment opportunities in the California Central Valley and the coast areas, many more people commute between the California Central Valley and San Francisco Bay Area through Altamont Pass. In this study, we use surveys to investigate these commuters' perception regarding their commuting experiences and their behavior about the choice of transportation modes. We compare our results from the survey results conducted in 2000 and 2006 to discuss the changing process of commuters' perception and behavior.

## **Understanding Diversity in Technology Leadership: Exploring the Characteristics of Firms with Powerful Female Technology Leaders**

*Joseph Taylor*

*California State University, Sacramento*

Boosting gender diversity in leadership teams has been a goal of firms in many industries. Within the technology sector the representation of female leadership has been identified as particularly lacking. While the representation of female leadership has grown in recent years, relatively little research has examined the factors that are associated with firms that have developed gender diversity within their senior technology leadership. This research uses logistic regression with fixed effects to analyze 25 years of panel data retrieved from Compustat and Execucomp databases to examine the characteristics of firms that have powerful, female technology leaders. Firms that demonstrate lower levels of cost management focus were more likely to have powerful female leadership. Greater levels of female leadership were further observed with higher levels of power distance and when power distance interacts with the competitive intensity of the industry in which the firm operates. However, the influence of power distance demonstrates a curvilinear effect as extremes of higher and lower levels of power distance were associated with greater female representation of powerful technology leaders, and the curvilinear interaction effect between power distance and competitive intensity was also negative. This research demonstrates that firms with lower levels of egalitarianism within the senior leadership team, which operate in complex, dynamic industry environments have been most likely to have powerful female leaders responsible for technology.

## **Data Envelopment Analysis and Software Packages for Measuring Building Energy Efficiency**

*Zinovy Radovilsky, California State University, East Bay*

*Pallavi Taneja, California State University, East Bay*

*Payal Sahay, California State University, East Bay*

Data Envelopment Analysis (DEA) is a popular approach in identifying efficiency of similar units. Its utilization in measuring and comparing buildings' energy efficiency is still an evolving subject in the academic research. In this paper, we addressed and resolved several gaps in the existing DEA research and methodologies for energy efficiency analysis. We introduced energy efficiency indices as a part of DEA models' outputs and applied transformation output variables to solve these DEA models. We also compared results of applying main DEA models and analytics software packages to identify the most consistent/reliable model and software package for measuring energy efficiency with DEA. Overall, this research will have an important impact in utilizing most appropriate DEA models and software packages for energy efficiency management in buildings.

## **Effectiveness of Handling Risks in IS Development – An Analysis of 50 Cases**

*Evander Herrera, California State University, Dominguez Hills*

*Myron Sheu, California State University, Dominguez Hills*

The main purpose of this research project is to assess the effect of risk management according to the success measures of IS projects. Since there is a great degree of uncertainty associated with IT projects, effectively handling IS project risks will help obtain tangible results in the short-term and intangible results in the long-term as well. Specifically, we investigate 50 IS development projects via a survey distributed to IS students in CIS classes in the past two years. The survey focuses on 15 commonly cited risk factors, how the firms respond to these risk factors, and the results in light of 4 project success measures. Statistical analyses are conducted to provide statistical insights and managerial implications. Furthermore, risks are analyzed in terms of four groups, namely function, complexity, technology, and user. Success is measured in four dimensions, namely cost, quality, schedule, and scope. The findings from the analysis are quite contrary to what we have initially imagined, and they should certainly be thought-invoking to industrial practitioners and academic researchers in the field of IS project management. Some significant, though preliminary due to limited statistical reliability, implications are still worth mentioning: 1) Corporate support is more effective than efforts by individual projects and thus corporate readiness can indicate the success chance of an IS project, and 2) Risks related to functional issues and system complexity, rather than technology, are more adversely impactful. As process and data flows are increasingly intertwined, resulting risks could be more adverse.

Session 2B	Operational Implications/Marketing and Business Applications
Location	Henry Madden Library Rm 3212
Time	1:45 – 3:30
Session Chair	<i>Y. Helio Yang, San Diego State University</i>

### **Managing Service Outsourcing in Healthcare: A Comparative Study**

*Yuan Ye, California State University, Sacramento*

*Yang Sun, California State University, Sacramento*

While service outsourcing (e.g., information technology outsourcing, business process outsourcing, legal process outsourcing, finance and accounting outsourcing, etc.) has been extensively examined in the literature, there is less research on how the relevant activities are carried out in the healthcare industry. We conduct an in-depth survey through two organizations: The Institute for Supply Management (ISM) and the Association for Health Care Resource and Materials Management (AHRMM). By collecting information on a variety of outsourced services, we compare status quos, impacts, concerns, procurement strategies and management practices between the healthcare industry and various other industries. A general contracting framework is then proposed to help both buyers and service providers increase their business in the dynamic and fast-growing market of outsourcing in healthcare.

### **Supply Chain Relational Capital and the Bullwhip Effect: An Empirical Analysis Using Financial Disclosures**

*Rong Zhao, Raj Mashruwala, University of Calgary*

*Shailendra (Shail) Pandit, University of Illinois at Chicago*

*Jaydeep Balakrishnan, California State University, Sacramento*

The primary objective of this study was to conduct a large-sample empirical investigation of how relational capital impacts bullwhip at the supplier. We used mandatory disclosures in regulatory filings of US firms to identify a supplier's major customers. Multivariate regression analyses are performed to examine the effects of relational capital on bullwhip at the supplier. The findings show that bullwhip at the supplier is greater when customers are more dependent on their suppliers but is reduced when suppliers share longer relationships with their customers. Suppliers that have longer term relationships with customers also tend to experience less bullwhip. The results also provide additional insights on several firm characteristics that impact supplier bullwhip. Further, we document that the effect of supply chain relationships on bullwhip tends to vary across industries and over time.

### **Bargaining Over Data with Consultant as a Gatekeeper**

*Jyotishka Ray, California State University, East Bay*

*Syam Menon, University of Texas at Dallas*

*Vijay Mookerjee, University of Texas at Dallas*

The explosive growth of eBusiness has allowed many companies to accumulate a repertoire of unique data sets which are a growing source of revenue for their owners. Given its proprietary nature, the value of the data is often uncertain to both seller and the buyer. A seller can choose to provide a free demonstration (presentation) to mitigate this uncertainty and allow the buyer to arrive at a more accurate estimate of the value of the data. Often, the buyer hires a consultant to perform data analytic services for them. In such situations, all three parties collectively decide the price of the data and the service charge to be paid by the buyer to the consultant. In this paper we develop a three-party bargaining framework to analyze this data monetization process where the consultant plays the role of a gatekeeper and incurs a processing cost to provide data analytic services.

## **National Drug Shortage Impacts on Medi-Cal**

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Drug utilization data from Medi-Cal between 2006 and 2011 were analyzed before and after the escalating shortage of sterile injectable oncology drugs (SIOs) crisis in 2009 for pattern changes in terms of the range of drug types, the drug prescribed frequency, the reimbursed volume, and the drug prices. The results showed statistically significant changes in the utilization patterns as well as the drug prices. After the crisis, a wider range of SIO drugs was prescribed and more prescriptions were issued. The average drug price showed an opposite trend that the average price increased significantly on established SIO drugs in shortage while the non-shortage SIOs had a small increase in price. This study contributes to the comprehensive assessment of the drug shortage issues in the nation.

## **Political Marketing as a Potent Tool for Product Diversification**

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Firms struggle to succeed in today's economy. With product diversification as a means toward growth and performance, organizations seek to grow its interaction with the government with the help of lobbyists. Government agencies can shape and impact the organizations' opportunity sets and the corresponding competitive environments. Therefore, firms realize that maintaining a close relationship with government agencies is vital to be up to date about legislative developments. To develop that relationship, firms use lobbying as one of the most effective methods for persuading these agencies. Extant research looked at the effect of public policies on firm outcomes and advised managers to understand the process pertaining to having successful relationships with government agencies. This research aims to capture the impact of firms' lobbying effort on product diversification through government agency interactions, building on the Resource-Based View (RBV) theory. Findings indicate that higher firms' lobbying effort is related to higher levels of government agency interactions. In addition, a greater amount of repeat government agency interactions was concomitant with greater product diversification. The results propose the importance of firms' lobbying effort and government interactions when pursuing ways to increase firms' performance and growth through product diversification.

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