

From the Chair's Desk

- Cheryl Druehl

Greetings TMS members and friends,

It's hard to believe another year has passed and we are excitedly preparing for INFORMS again. This year we have a great lineup of talks and awards, throughout the four days of INFORMS. We will also have refreshments at the TMS Business Meeting on Monday evening, so please join us!

I would like to extend special thanks to our Past Chair, Juliana Hsuan. Juliana has been part of the TMS board now for six years, filling in as needed. She served as Chair for two years, ran the dissertation contest twice, and recruited the TMS Distinguished Speaker two years in a row as well. She has been a vital part of TMS and we appreciate her efforts and assistance in all TMS matters. For me personally, she has become a friend and collaborator as well through our work here together. Thanks Juliana!!

Please drop in to the TMS sessions. The TMS program is full of interesting talks and opportunities to meet others in the area. I would like to thank our Program Chair, Sinan Erzurumlu, for organizing the TMS program and for collaborating with Karthik Ramachandran and Jeremy Hutchinson-Krupat (of the NPD cluster). Similar to previous years, we will feature a "Meet the Editors" session, a joint effort between the TMS and NPD clusters, on Sunday at 4:30 pm. This is a great opportunity to meet the editors and departmental editors of technology, innovation and entrepreneurship journals and hear their insights into the publishing process. (See more in Sinan Erzurumlu's report on p. 7.) Thanks to Sinan also for organizing a mini-track of two sessions on Sunday morning (8:00 and 11:00) and a third on Wednesday on entrepreneurship. This is Sinan's

third year of organizing this and it is always intellectually stimulating as well as crowded.

We will also feature a Distinguished Speaker session. Our 2013 Distinguished Speaker Award goes to Professor Dundar Kocaoglu of Portland State University and one of the founders of the current TMS group. Professor Kocaoglu was a pioneering academic and consultant in research and practice on technology management. We thank Professor Kocaoglu for honoring us with the opportunity to share his experiences and vision in his talk "Innovation and Technology Management in the Technology Era," on Monday October 7th at 4:30 pm (see more in Juliana Hsuan's report on p. 3).

This year we present our second annual, "TMS Best Paper Award" for the best Technology Management paper published in 2008. The winning paper is "Is the tendency to engage in entrepreneurship genetic?" by Nicos Nicolaou, Scott Shane, Lynn Cherkas, Janice Hunkin, and Tim D. Spector, and published in Management Science. The runner up is "The impact of uncertain intellectual property rights on the market for ideas: Evidence from patent grant delays" by Joshua Gans, David Hsu, and Scott

TMS BUSINESS MEETING

The Technology Management Section business meeting will be held on **Monday, October 7, at 6:15 pm**. Please join the TMS officers and other distinguished colleagues for a wine and cheese reception after the meeting.

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TMS OFFICERS 2013

Stern, also published in Management Science. Representing the winning author teams, Professors Nicos Nicolaou and David Hsu will present on Tuesday, October 8th from 11am-12:30pm and Professor KK Sinha will serve as a distinguished discussant. We appreciate their participation and look forward to hearing how the papers were developed and later built upon. Join us also at the TMS Business Meeting for the Award presentation. (See more in Leonardo Santiago's report on p. 6.)

This year's doctoral dissertation award competition was coordinated by our Chair-Elect Leonardo Santiago. The winner is Ayfer Ali, for his dissertation on "From Idea to Product – Translating Knowledge between the Lab and the Clinic." The Runner-up is Phillip C. Anderson for his dissertation on "Complementary Capabilities in Dynamic Environments: The Evolution of Professional Services in Information Technology Product Firms." (See more in Leonardo Santiago's report on p. 4.) Congratulations to Ayfer and Phil! Join us at the Business Meeting for the presentation of their awards.

This newsletter has been prepared by our Vice Chair-Membership & Communication, Jianxi Luo. Thank you! Finally, I would like extend my sincere thanks to our excellent CIO, John Angelis, for managing our TMS home page (<http://tms.section.informs.org>). We would also like to recognize our former CIO, Ken Hung, for his many years of service.

Finally, if you have suggestions for TMS or would like to become a TMS officer, please contact one of the current officers.

On behalf of all of the officers, I wish you a fun and fruitful conference. May you build new friendships and exciting collaborations. Stop by and meet us and other TMS members to begin.

I and the other TMS officers look forward to seeing you in Minneapolis!

Best Regards,
Cheryl



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Dunder Kocaoglu

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**2012 Distinguished Speaker
INFORMS**

Technology Management Section

- Juliana Hsuan

I am delighted to announce the INFORMS TMS 2013 Distinguished Speaker, Professor Dunder Kocaoglu. Professor Kocaoglu is also the President and CEO of PICMET (Portland International Center for Management of Engineering and Technology), and Director of RISE (Research Institute for Renewable Energy). He is one of the originators of the engineering and technology management field. He began developing it when he was at the University of Pittsburgh in the 1970s, and soon became a much sought-after consultant to universities, private companies, and the United Nations. During the late 1970s, Professor Kocaoglu was one of the founders and the 3rd president of Omega Rho International Honor Society formed in TIMS/ORSA.

Professor Kocaoglu was the key person who formed our TMS entity within INFORMS. TMS is the transformation of several previous entities in TIMS first, then INFORMS. It started as COLEM (College on Engineering Management), and later became COLTEM (TIMS College of Engineering

Management), COLIME (College on Innovation Management and Engineering) and finally TMS. When Professor Kocaoglu founded COLEM with four other colleagues and became its founding president in 1979, the TIMS/ORSA Community was saying "What is the difference between managing engineering and managing a retail organization? Do we need anything in engineering management?". The idea was that new. We have come a long way since then!

Professor Kocaoglu's research areas include technology management, project management, R&D management, decision theory, hierarchical decision modeling, evaluation and selection of emerging technologies, and resource optimization. He has received a total of approximately one million dollars in research grants and contracts from government agencies and industrial corporations.

Professor Kocaoglu received his B.S. in Civil Engineering from Robert College in 1960, M.S. in Structural Engineering from Lehigh University in 1962, M.S. in Industrial Engineering from the University of Pittsburgh in 1972, and Ph.D. in Operations Research and Systems Management, also from the University of Pittsburgh in 1976. He joined Portland State University to start the Engineering Management Program in 1987. The program has become the Engineering and Technology Management Department. It now has about 250 students working toward the M.S. and Ph.D. degrees. Prior to 1987, Professor Kocaoglu was the director of a similar program for 11 years at the University of Pittsburgh.

Professor Kocaoglu has worked in industry as an engineer and project manager from 1962 to 1971. He has been a consultant on engineering and technology management since 1973. His clients include Westinghouse, Brown Boveri, IBM, Intel Corporation, Tektronix, Il-Morrow, Cascade Microtech, several other small-to-medium sized technology-based companies, more than 10 universities, R&D Centers and the United Nations. He has served in National Research Council committees for the evaluation of the NIST



Ayfer Ali

The winner of TMS 2013 TMS Doctoral Dissertation Award is Ayfer Ali for her dissertation titled: "From Idea to Product – Translating Knowledge between the Lab and the Clinic." Ayfer completed her studies Harvard University in January 2012, and worked under the supervision of Professor Robert Huckman, chair of her dissertation committee, and Prof. Iain Cockburn. Ayfer's dissertation looks at the path of knowledge and ideas between the scientific bench and the medical clinic and eventually to becoming products. One paper looks at the demand side of markets for technology (MFT) in the context of licensing inventions from Academic Medical Center (AMC). Another paper looks at the importance of cross-domain expertise in the inventing team (at two AMCs) on the hazard of licensing of their inventions. Finally, a third paper looks at the translation of knowledge from the clinic to the scientific domain by exploring how the focus and diversity of cardiac surgeons' clinical work influences their creative output as measured by academic articles. Ayfer Ali is currently an Assistant Professor at Universidad Carlos III in Madrid.

The Runner-Up of TMS 2013 TMS Doctoral Dissertation Award is Phillip C. Anderson for his dissertation titled "Complementary Capabilities in Dynamic Environments: The Evolution of Professional Services in Information Technology Product Firms ". Phil completed his studies at the



Phillip C. Anderson

Massachusetts Institute of Technology in March 2012, under the supervision of Professor Michael A. Cusumano. Phil's dissertation combines a resources and capabilities lens from the strategic management literature with a management of innovation perspective to examine when, why, and how product innovation firms evolve their services strategy within the IT hardware industry from 1987-2008. The dissertation pulls together evidence from over 300 US-based firms with a deeper dive within two fast-growth product firms to examine the process and unique dilemmas faced when attempting to expand a services position beyond the classic product support and break-fix service models. Phil is currently an Assistant Professor at the University of Illinois, Urbana-Champaign, within the Strategy & Entrepreneurship Group at the College of Business.

Come to listen to presentation of the finalists of the 2013 TMS Doctoral Dissertation Award on Monday, October 07th, 11:00 - 12:30, at the session "Emerging Scholars in Technology Management".

Congratulations to Ayfer and Phil for their accomplishments!

See previous winners at <http://tms.section.informs.org/> under Awards.



We have the pleasure to announce the Technology Management Best Paper Award for the year of 2013:

Winner

Nicolaou, Nicos, S. Shane, L. Cherkas, J. Hunkin, T. D. Spector. Is the tendency to engage in entrepreneurship genetic? *Management Science*. Vol. 54, No. 1, January 2008, pp. 167–179

Runner-up

Gans, Joshua, D. Hsu, S. Stern. The impact of uncertain intellectual property rights on the market for ideas: Evidence from patent grant delays. *Management Science*. Vol. 54, No. 5, May 2008, pp. 982–997

During 2011 and 2012, we have had the pleasure of working with the department editors at *Management Science* and at *Organization Science* to create the parameters for an annual INFORMS Technology Management best paper competition. The idea and initial process for this award came from Erica Fuchs (Carnegies Mellon) and we appreciate her initiative. Together with the Editors, the board members of the INFORMS Technology Management Section chose a system in which the best papers for the annual competition would be narrowed down to the top-cited technology management papers in INFORMS journals from five years earlier (e.g., for the year 2013, we considered papers published in 2008). Then, a panel of distinguished scholars, leaders in the field of Technology Management domain, would select the top paper and the runner-up. Winners would be presented with a plaque, and invited to present their work that

has built on that paper since its publication at the INFORMS Annual Meeting in a special session with a special-guest discussant.

This award was established last year, in 2012, and the winners were Melissa Schilling and Corey Phelps for the paper "Interfirm collaboration networks: The impact of large-scale network structure on firm innovation" published in *Management Science* (2007) vol. 53 no. 7. We would like to express our gratitude to Erica Fuchs and Cheryl Druehl for setting the ball rolling for the award process and managing last year's contest. Also, we are in debt to Kathleen Eisenhardt, Bruce Kogut, and Karl Ulrich for their work in the panel of distinguished scholars and Linda Argote who served as discussant. Their effort made this award a reality. Thank you very much to all of you!

For this year, after narrowing down the papers to those with top citations, Karim Lakhani, Melissa Schilling, and Kingshuk Sinha served on the best paper selection panel. We would like to thank them for being part of the Panel of Distinguished Scholars!

The finalists will be presented with a plaque at the INFORMS Technology Management Business meeting on Monday, October 7th during the INFORMS Annual Meeting, in Minneapolis, MN, 6:15pm (room to be assigned). Please, come and join us to congratulate them!

We would also like to invite you to come to a special session on Tuesday, October 8th from 11am-12:30pm starring the award finalists. In this session, Nicos Nicolaou and David Hsu, respectively, will present the winning works and the research built thereon. Professor KK Sinha will be the special-guest discussant of this session.

Again, congratulations to the winners and finalists of the Best Paper Award Competition for the year of 2013!

- Leonardo P. Santiago

INFORMS -Technology Management Section Minneapolis, Minnesota, 2013 Sponsored Program (October 06 - 09, Sun - Wed)

- S. Sinan Erzurumlu

Dear TMS Colleagues,

On behalf of the Technology Management Section, it is a pleasure to welcome you to the 2013 INFORMS Annual Meeting where we are excited to share two great clusters with you: Technology Management and New Product Development. These two clusters offer an exciting combination of technology, innovation, product development and entrepreneurship sessions. We would like to take this opportunity to thank all of the session chairs and participants for their contribution to this year's terrific program.

As always, the talks for this year are quite diverse and appealing. We would like to invite you to review the session descriptions in the newsletter and online to make the most out of the conference. You will have the opportunity to enjoy the state of the art of our field from Sunday, October 06th 2013, to Wednesday, October 09th 2013. It will be hard to decide with so many great options. We would like to draw your attention to some of the special sessions:

- This year we continue our mini-track on Innovation and Entrepreneurship for its third year. There will be three sessions, Sunday at 8 and 11, and Wednesday at 8. The first focuses on product development and deployment in entrepreneurial settings, the second is all about the interface of entrepreneurship and technology management, and the one Wednesday morning includes papers about theory and action in entrepreneurship.
- One special session you should consider "not to be missed" on Monday afternoon is co-sponsored by the Technology Management Section and New Product Development. The

session is "Meet the Editors" and will be held on Sunday, October 06, 2013, from 4:30 pm to 6:00 pm. We will be joined by editors (journal, department and senior) of Management Science, Production and Operations Management Journal, Strategy Science, IEEE Transactions on Engineering Management, and the Journal of Operations Management. We thank them for their support of our two areas and are looking forward to hearing their viewpoints.

- On Monday, October 07, 2013, the Technology Management Distinguished Speaker, Professor Dundar Kocaoglu, Professor and Chairman of the Engineering and Technology Management Department at Portland State University, and President and CEO of PICMET (Portland International Conference on Management of Engineering and Technology), will be speaking about "Innovation and Technology Management in the Technology Era" from 4:30 to 6:00 pm.
- On Tuesday, October 08, 11:00 am - 12:30 pm, we will have the Technology Management Section Best Paper Winner Presentation, chaired by Leonardo Santiago. In this session, Nicos Nicolaou and David Hsu, respectively, will present the winning works and the research built thereon. Professor KK Sinha will be the special-guest discussant of this session (see award description for more details).

Thank you for all of your support for the Technology Management and New Product Development INFORMS sessions held every year.

We hope to see you in Minneapolis!
S. Sinan Erzurumlu

Sunday, October 6

SA: 08:00 - 09:30 Product Development and Deployment in Entrepreneurial Settings

CHAIR: **Sinan Erzurumlu**, Babson College, serzurumlu@babson.edu

Optimal Learning and Development Strategy for Entrepreneurial Product Launch

PRESENTING AUTHOR: **Onesun Yoo**, University College London, o.yoo@ucl.ac.uk

CO-AUTHOR: **Tingliang Huang**, University College London, t.huang@ucl.ac.uk

ABSTRACT: An early stage entrepreneurial firm with a new product concept must maximize the chance of successful product launch. To avoid developing an unwanted product, practitioners suggest a lean approach to development, i.e., a firm should iteratively launch an unfinished product to learn what the consumers want and to alter the final product goal whenever necessary. We formalize this approach via the Bayesian learning framework, and investigate the optimal development strategy.

Ownership Allocation between Entrepreneurs and Venture Capitalists

PRESENTING AUTHOR: **Meyyappan Narayanan**, Fairleigh Dickinson University, meyyappan.narayanan@gmail.com

ABSTRACT: We model ownership allocation in venture capital investment using agency theory and find that, for the entrepreneur to receive maximal economic rent, the venture capitalist (VC) should be allocated ownership equaling the VC's output elasticity--namely, the importance of the VC's service to the success of the venture--and the entrepreneur should be allocated all the rest, and vice versa.

Business, R&D, and Open Innovation: An Empirical Study of How Managers Differ in Strategy and Focus

PRESENTING AUTHOR: **John Angelis**, Rochester Institute of Technology, jangelis@saunders.rit.edu

CO-AUTHOR: **John Ettlie**, Rochester Institute of Technology, jettlie@saunders.rit.edu; **Joseph Miller**, Rochester Institute of Technology, jmiller@saunders.rit.edu

ABSTRACT: We analyze a study of open innovation (OI) in firms by Forrester Research for Innocentive. Overall, business managers have a broader, more optimistic perception of OI, particularly in relation to market. R&D managers are more sensitive to information flow barriers and emphasize different tactics in applying OI.

Entrepreneurial Technology Commercialization

PRESENTING AUTHOR: **Sinan Erzurumlu**, Babson College, serzurumlu@babson.edu

CO-AUTHOR: **Karthik Ramachandran**, Georgia Institute of Technology, Karthik.Ramachandran@scheller.gatech.edu; **Yusen Xia**, Georgia State University, yxia@gsu.edu

ABSTRACT: Startup firms in many technology intensive industries license innovations to potential competitors besides using them in their own products. In this paper, we develop a model to understand if, when and how a firm should share its innovation with a rival. Our conclusions lead to a nuanced understanding of form of licensing as a lever for controlling competition in product markets.

SB: 11:00 - 12:30 Entrepreneurship, Innovation and Technology Management

CHAIR: **Sinan Erzurumlu**, Babson College, serzurumlu@babson.edu

Innovation, Openness & Platform Control

PRESENTING AUTHOR: **Geoffrey Parker**, Tulane University, gparker@tulane.edu

CO-AUTHOR: **Marshall Van Alstyne**, Boston University, mva@bu.edu

ABSTRACT: We examine how exercising control over a technology platform can increase profits and innovation. By choosing how much to open and when to bundle enhancements, platform sponsors can influence ecosystem partner choices. Results can inform innovation strategy, choice of organizational form, antitrust and intellectual property law, and competition management.

The Overconfident Entrepreneur's Role in the Evolution of Innovation

PRESENTING AUTHOR: **Jennifer Bailey**, Georgia Institute of Technology, Jennifer.Bailey@scheller.gatech.edu

ABSTRACT: We explore the existence of overconfident entrepreneurs as a necessary ingredient for the introduction and persistence of radical innovations. We consider how vicarious learning impacts the decisions of individual agents to invest in radical innovation under different industry performance selection environments.

Pioneering Choices: The Good, the Bad, the Policy Opportunity, the Good

PRESENTING AUTHOR: **Moren Levesque**, York University, MLevesque@schulich.yorku.ca

CO-AUTHOR: **Richard Arend**, University of Missouri, arendr@umkc.edu

ABSTRACT: We provide a mathematical model of pioneering strategic choice that differs from those in the first-mover literature in terms of the extent to which we assume pioneers can mold the 'profit equation' involved in commercializing invention. We find an interesting pattern of outcomes arising from the strategic choices possible, including some outcome areas where expected inefficiencies can be addressed through effective policy to improve overall welfare.

Fire in the Belly? Employee Motives and Innovative Performance in Startups versus Established Firms

PRESENTING AUTHOR: **Henry Sauermann**, Georgia Institute of Technology, Henry.Sauermann@scheller.gatech.edu

ABSTRACT: We compare startup employees' pecuniary and non-pecuniary motives with those of employees working in small and large established firms, and examine the extent to which existing differences in motives distinguish employees' innovative performance. Using data on over 10,000 U.S. R&D employees, we find significant differences in motives and innovative performance across firm types and the former partly explain the latter.

SC: 13:30 - 15:00 New Product Development

CHAIR: **Debasish N. Mallick**, University of St. Thomas, dnmallick@stthomas.edu

Improving the Systems Engineering Process with Multi-Domain Mapping

PRESENTING AUTHOR: **Nitin Joglekar**, Boston University, joglekar@bu.edu
 CO-AUTHOR: **Steven Eppinger**, Massachusetts Institute of Technology, eppinger@mit.edu; **Alison Olechowski**, Massachusetts Institute of Technology, alisono@mit.edu; **Terence Teo**, Massachusetts Institute of Technology, tereteo@mit.edu

ABSTRACT: Multi domain development decisions (e.g. dependencies across system architecture and integration task domains) can be assessed using the DSM method. Data collected during early development stage of a large engineering project are used to construct a domain mapping matrix (DMM). Analysis of this matrix, using alternative metrics, facilitates the visualization of integration challenges for individual components within the system and establishes the efficacy of various integration testing tasks.

The Future of New Product Development

PRESENTING AUTHOR: **Sebastian Fixson**, Babson College, sfixson@babson.edu

ABSTRACT: We explore how technological advancements in digital technologies such as digital design and rapid prototyping, together with a shift towards a sharing culture, are altering the nature of new product development processes with respect to participation, ownership, and the locus of expertise. Using a set of case studies we investigate new emerging models of new product development, and illustrate the consequences for managing them.

Do Gurus Breed Gurus? An Analysis of Collaboration in Design

PRESENTING AUTHOR: **Haibo Liu**, INSEAD Singapore, Haibo.Liu@insead.edu
 CO-AUTHOR: **Jurgen Mihm**, INSEAD, Jurgen.mihm@insead.edu; **Manuel Sosa**, INSEAD Singapore, manuel.sosa@insead.edu

ABSTRACT: Understanding the emergence of gurus is critical because gurus make disproportional contributions to their fields. We empirically pin down the mechanisms by which

collaborating with gurus affect the propensity of becoming a guru. In light of our findings, we suggest reevaluate the effect of knowledge transfer in collaborations along with the effect of attention transfer. We test our predictions using Event History Analysis on a large longitudinal dataset derived from design patents in U.S..

New Product Development (NPD): Impact of Design-Manufacturing Interface

PRESENTING AUTHOR: **Debasish N. Mallick**, University of St. Thomas, dnmallick@stthomas.edu

ABSTRACT: We explore the issues at the interface between design and manufacturing activities and examine how these issues impact the new product development performance.

SD: 16:30 - 18:00 Joint Session TMS/NPD: Meet the Editors

CO-CHAIRS: **Jeremy Hutchison-Krupat**, University of Virginia, krupatj@darden.virginia.edu; **Sinan Erzurumlu**, Babson College, serzurumlu@babson.edu; **Karthik Ramachandran**, Georgia Institute of Technology, Karthik.Ramachandran@scheller.gatech.edu

Meet the Editors

ABSTRACT: This interactive session aims at assisting readers and researchers in staying informed on the most important topics and the latest development in Technology, Innovation Management, Entrepreneurship and New Product Development.

Monday, October 7

MA: 08:00 - 09:30 Novel Research in Technology Management

CHAIR: **Zhijian Cui**, IE Business School, Zhijian.Cui@ie.edu

Project Management under Uncertainty - How (and When) to Encourage Help

PRESENTING AUTHOR: **Fabian Sting**, Erasmus University, fsting@rsm.nl
 CO-AUTHOR: **Pascale Crama**, Singapore Management University, pcrama@smu.edu.sg; **Yaozhong Wu**, National University of Singapore, bizwyz@nus.edu.sg

ABSTRACT: Inspired by a real-life NPD organization, we present a model of a project management system that incorporates cooperative behavior. Core element of the system is that project managers may mutually ask for and provide help. We study the system's performance in various environments. A natural order of projects emerges, even with symmetrical projects: the firm induces different effort levels for projects. This order also explains the value of help under correlated uncertainties between projects.

Operationalizing Strategy and the Specificity of Communication

PRESENTING AUTHOR: **Jeremy Hutchison-Krupat**, University of Virginia, krupatj@darden.virginia.edu

ABSTRACT: The implementation of a firm's strategy often begins when senior management communicates it to the employees that are ultimately tasked with operationalizing the strategic initiatives that will support the firm's objectives. This paper investigates how the level of detail that senior management communicates for a particular strategic initiative could influence the actions of a cross-functional team.

Hierarchy and Evolvability of Innovation Ecosystems

PRESENTING AUTHOR: **Jianxi Luo**, Singapore University of Technology & Design, lu@sutd.edu.sg
 CO-AUTHOR: **Eric Lucas**, University of Zurich, eric.lucas@uzh.ch

ABSTRACT: We model an innovation ecosystem as a directed network of firms, simulate a full spectrum of such networks with varied hierarchy degrees, and evaluate their "performance landscapes" using "NK model". Results show hierarchy in ecosystems gives rise to landscape ruggedness, indicating a higher chance for an ecosystem to be locked at local optima and unable to evolve, and higher tendency of firm behaviors and strategies toward exploitation rather than exploration.

Cost-reducing Innovation and the Role of Patent Intermediaries

PRESENTING AUTHOR: **Shantanu Bhattacharya**, INSEAD Singapore, shantanu.bhattacharya@insead.edu
 CO-AUTHOR: **Anupam Agrawal**, University of Illinois, anupam@illinois.edu; **Sameer Hasija**, INSEAD Singapore, sameer.hasija@insead.edu

ABSTRACT: Patent intermediaries act as non-practicing entities, who buy innovations from an external provider and then license them to practicing firms. This paper considers the competition between two identical incumbent firms and a patent intermediary for acquiring a cost-reducing innovation from an external innovator. The analysis of the model shows that patent intermediaries participate in patent markets only if the innovation is incremental.

MB: 11:00 - 12:30 Emerging Scholars in Technology Management

CHAIR: **Leonardo Santiago**, Federal University of Minas Gerais, lsantiago@ufmg.br

Complementary Capabilities in Dynamic Environments: The Evolution of Services in IT Product Firms

PRESENTING AUTHOR: **Phillip Anderson**, University of Illinois, Urbana-Champaign, philca@illinois.edu

ABSTRACT: This dissertation explores the fast-paced IT product industry that rewards firms for innovation and fast growth, yet some firms have altered their strategic positioning in services as exhibited by a few multibillion dollar acquisitions in recent years. This signal suggests that

the innovator has strategic options beyond the classic product-process innovation models. With data on 300+ firms from 1987-2008 and two case studies, I examine how this services phenomenon emerges and evolves.

Industry Location Shift through Technological Change - A Study of the U.S. Semiconductor Industry

PRESENTING AUTHOR: **Jon Kowalski**, McKinsey & Co., jon@jonkowalski.com

ABSTRACT: Silicon Valley is a storied region regarded as a model for economic development. Many governments have attempted to re-create the success of Silicon Valley. However, it is not clear that we know what led to the region's success, as existing work has not pursued industry-wide firm-level analyses to examine such mechanisms. This work seeks to begin to address this literature gap in order to better inform regional economic development policy moving forward.

From Idea to Product – Translating Knowledge between the Lab and the Clinic

PRESENTING AUTHOR: **Ayfer Ali**, Universidad Carlos III de Madrid, aali@emp.uc3m.es

ABSTRACT: In my research I explore knowledge translation from the laboratory bench to the clinic and back. Using patent and licensing data from two of the largest Academic Medical Centers in the US, I explore team knowledge composition and its influence on translation. I also explore the demand side of markets for technology and the importance of existing technology on the decision to license an invention.

MC: 13:30 - 15:00 Innovation in Product, Service and Process Systems

CHAIR: **Juliana Hsuan**, Copenhagen Business School, jh.om@cbs.dk

An Analysis of Coffee Brands

PRESENTING AUTHOR: **Eric Bentzen**, Copenhagen Business School, eb.om@cbs.dk

ABSTRACT: In this paper we take a closer look at an expansion of the market share model to separate between competitors and use cross-elasticities to model the interaction between coffee prices and quantity sold and add the effect from events. We use the multiplicative competitive-interaction model as proposed by Cooper (1993) to model the market share of coffee brands.

Network Analysis of Bibliographic Data from the Literature on Modularity

PRESENTING AUTHOR: **Thomas Frandsen**, Copenhagen Business School, tfr.om@cbs.dk

ABSTRACT: This paper applies network analytical techniques to citation data from the literature on modularity in the fields of management and engineering. This methodology for studying citation structure enables the identification of distinct areas of research on modularity as well as

intellectual positions on which the literature is based. The analysis advances our understanding of the literature on modularity by systematically identifying its intellectual structure and evolution.

Innovation Differences between New Venture Startups and Incumbent Firms

PRESENTING AUTHOR: **Jianxi Luo**, Singapore University of Technology & Design, luo@sutd.edu.sg
 CO-AUTHOR: **Katja Otto**, Singapore University of Technology & Design, katja_otto@sutd.edu.sg; **Kevin Otto**, Singapore University of Technology & Design, kevin_otto@sutd.edu.sg

ABSTRACT: To understand how innovations from new ventures and incumbents may differ, we compare a sample of 92 award-winning innovations from either new venture or incumbent firms, with respect to product-level characteristics in functionality, architecture, cost, external and user interactions. Results show new venture products hit more innovation characteristic categories than those from incumbents. New ventures also exhibit higher rates of innovation than incumbents in each of the five categories.

Corporate Travel Services: A Triadic and Modularity Perspectives

PRESENTING AUTHOR: **Anu Bask**, Aalto University, anu.bask@aalto.fi
 CO-AUTHOR: **Dan Andersson**, Chalmers University of Technology, dan.andersson@chalmers.se; **Anne-Maria Holma**, University of Vaasa and Chalmers University of Technology, anne-maria.holma@uva.fi; **Antti Laakso**, Aalto University, antti.laakso@aalto.fi

ABSTRACT: In this study we take the buyer's perspective and explore how modularity and service triads are used in service development in indirect sourcing context. We provide a case study where the focal service triad consists of a buyer, technology provider and travel management company. To increase understanding of modular service supply chain networks, we develop a framework for modular service architecture. As methodology we apply longitudinal case study and insider action research.

MD: 16:30-18:00 TMS Distinguished Speaker

CHAIR: **Juliana Hsuan**, Copenhagen Business School, jh.om@cbs.dk

Innovation and Technology Management in the Technology Era

PRESENTING AUTHOR: **Dundar Kocaoglu**, Portland State University, kocaoglu@etm.pdx.edu

ABSTRACT: Every era in human history has had its characteristics shaped by the dominant forces representing that era. The technology era that the world has now entered is following the same pattern. It is clear that technology is the dominant force in the world of the 21st century where rapid technological changes are leading to rapid societal changes. The opportunities and challenges of managing

and leading the technology era are discussed in this presentation.

Tuesday, October 8

TA: 08:00 - 09:30 Managing Technological Innovation: Exploring Multiple Perspectives

Chair: **Tugrul Daim**, Portland State University, tugrul@etm.pdx.edu

Innovation Management Processes and Tools: A Case Study Approach from the Utility Industry

PRESENTING AUTHOR: **Jisun Kim**, Bonneville Power Administration, jxkim@bpa.gov
 CO-AUTHOR: **Judith Estep**, Bonneville Power Administration, jaestep@bpa.gov

ABSTRACT: To manage innovation effectively a systematic process is required. Often these processes are independent of the industry and include identifying strategies, developing strategic portfolios, managing the projects, and finally moving from research and development (R&D) into application. A case study approach is used to describe an example of institutionalizing R&D management in the utility industry. Finally, lessons learned are captured to help researchers avoid similar barriers.

Finding Your Business Partners with Machine Learning of Business Data

PRESENTING AUTHOR: **Yuya Kajikawa**, The University of Tokyo, kajikawa@mot.titech.ac.jp
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ABSTRACT: Business development is vital for any firms. In this work, we develop a computational approach to find business partners based on firm profiles and transaction relationships among them. We applied machine learning techniques to model customer-supplier relationships. The results showed that our approach successfully found plausible suppliers, customers and outsources, and can support to develop one's own business in the complicated, specialized and rapidly changing business environments.

A Multi-criteria Decision Model for Developing Technology Standards in the ICT Industry

PRESENTING AUTHOR: **Ramin Neshati**, Intel Corporation, ramin.neshati@intel.com

ABSTRACT: Firms contribute their own or license others' Intellectual Property (IP) in building standards-based products. How do firms decide whether or not to join a standards organization in the face of IP-related risks? The literature is devoid of a decision model to address this question. Using the Analytic Hierarchy Process (AHP) and data derived from panels of experts representing ICT firms, a robust decision support model is developed that comprehends the critical decision criteria and alternatives.

Developing a Strategic Policy Choice Framework

PRESENTING AUTHOR: **Leong Chan**, Portland State University, vleongv@gmail.com
 CO-AUTHOR: **Tugrul Daim**, Portland State University tugrul@etm.pdx.edu

ABSTRACT: The objective of this research was to construct a technology policy choice framework to formulate technology development strategies, linking prospective high-tech areas and various innovative resources to promote national S&T competitiveness and foster long term technological innovation. A hierarchical decision model was developed. This research focused on the fast developing Chinese pharmaceutical industry as a case study.

TB: 11:00 - 12:30 Technology Management Section Best Paper Winner Presentation

CHAIR: **Leonardo Santiago**, Federal University of Minas Gerais, Brazil, lsantiago@ufmg.br

Is the Tendency to Engage in Entrepreneurship Genetic?

PRESENTING AUTHOR: **Nicos Nicolaou**, University of Cyprus, and City University London, nicos.nicolaou@ucy.ac.cy
 CO-AUTHOR: **Scott Shane**, Case Western Reserve University, sas46@case.edu

ABSTRACT: Perhaps the most common question that practitioners ask about entrepreneurship is 'Are entrepreneurs born or made?' Unfortunately, despite more than 50 years of research, scholars have only recently tried to provide an answer to this question. This paper reviews the recent findings on the genetics of entrepreneurship. It examines the evidence for the effect of genes on the tendency to engage in entrepreneurial activity and outlines the direction of future research in this area.

Entrepreneurial Technology Commercialization Strategies: Past and Future Research

PRESENTING AUTHOR: **David Hsu**, Wharton School, University of Pennsylvania, dhsu@wharton.upenn.edu
 CO-AUTHOR: **Joshua Gans**, University of Toronto, joshua.gans@gmail.com; **Scott Stern**, Massachusetts Institute of Technology, sstern@mit.edu

ABSTRACT: We review our article, "The Impact of Uncertain Intellectual Property Rights on the Market for Ideas: Evidence from Patent Grant Delays," published in Management Science in 2008. After reflecting on the article, we examine the follow-on work, and conclude by discussing future avenues for research in this domain.

TC: 13:30 - 15:00 Outsourcing and Offshoring Innovation

CHAIR: **Saikat Chaudhuri**, University of Pennsylvania, saikatc@wharton.upenn.edu

Managing Complexity and Uncertainty in Offshore Outsourced New Product Development Projects

PRESENTING AUTHOR: **Saikat Chaudhuri**, University of Pennsylvania, saikatc@wharton.upenn.edu
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ABSTRACT: Motivated by its rising prominence, we investigate to what extent the offshore outsourcing approach can effectively transfer to complex and uncertain knowledge-intensive work like R&D, by developing a simulation model based on a sample of such projects by a leading vendor. We contrast the global delivery model with a consulting model, and find that each approach is more efficacious at handling different types of tasks, bearing implications for notions of firm boundaries and organizational forms.

Vendor Selection, Contract Efficiency, and Performance Measurement in Outsourcing

PRESENTING AUTHOR: **Zhijian Cui**, IE Business School, Zhijian.Cui@ie.edu
 CO-AUTHOR: **Sameer Hasija**, INSEAD Singapore, sameer.hasija@insead.edu

ABSTRACT: This study compares the efficacy of some commonly observed vendor selection and contracting mechanisms with respect to two key challenges in outsourcing of information and knowledge intensive service processes: vendor selection and contract efficiency. We also highlight the implications of performance-based contracts in services.

Impact of Interorganizational Coordination And Quality Metrics In Offshore Execution of Processes

PRESENTING AUTHOR: **Ravi Aron**, Johns Hopkins University, raviaron@jhu.edu
 CO-AUTHOR: **Praveen Pathak**, University of Florida, praveen.pathak@warrington.ufl.edu

ABSTRACT: We study the use of inter-organizational information systems (IIS) that allow the flow of information as well as the exerting of managerial control across the boundaries of the firm and their impact on the quality of work executed offshore in knowledge-intensive processes such as in Drug Trials. We find that the use of IIS is positively associated with higher levels of quality of work unlike the use of managerial control and that the knowledge intensity of the work plays a moderating role.

How Does Buyer's Knowledge Impact Outsourcing Strategies? A Game Theoretic Model

PRESENTING AUTHOR: **Qiong Chen**, Clemson University, qiongc@clemson.edu
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ABSTRACT: We introduce a signaling game to examine the outsourcing strategies of a buying firm that faces two options in determining a manufacturer to produce its new product: search directly or indirectly (through an intermediary). We demonstrate that buyer's knowledge about supply market influences its strategy and the intermediary's effort level.

TD: 16:30 - 18:00 Models of Innovation Management

CHAIR: **Debashish N. Mallick**, University of St. Thomas, dnmallick@stthomas.edu

New Service Development and Value Creation in E-retailing

PRESENTING AUTHOR: **Kingshuk Sinha**, University of Minnesota, ksinha@umn.edu
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Anto (John) Verghese, Texas A&M University, averghese@mays.tamu.edu

ABSTRACT: Technology-enabled new service development is investigated using multi-year panel data on e-retailers. A theory driven empirical analysis is conducted to assess how e-retailer's operating characteristics drive e-retailer survival or death, scaling up of operations, and business value. Survival-conditional effects of efficiency, lock-in, novelty, and complementarities on several performance metrics are examined.

Dynamic or Persistent? How to Spend on R&D

PRESENTING AUTHOR: **Christophe Pennetier**, INSEAD Singapore, cpennetier@gmail.com
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ABSTRACT: We examine the effect of the variability in R&D investments on a firm's operational performance. We hypothesize that firms that increase or decrease R&D investments in a short period of time, reduce the effectiveness of these investments irrespective of the absolute level of the investment.

Closed-loop Supply Chain Models in Manufacturing-Remanufacturing Operations

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ABSTRACT: While a centralized firm is more willing to design a product for re-manufacturability, in a firm where different divisions do the remanufacturing and manufacturing, the manufacturing division may need incentive to do so. Using a stylized model we analyze this problem and propose incentive systems to encourage the manufacturer to design the product that can be re-manufactured.

The Transformation of Innovation Ecosystems in Global Metropolitan Areas: A Data-Driven Perspective

PRESENTING AUTHOR: **Rahul Basole**, Georgia Institute of Technology, basole@gatech.edu
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ABSTRACT: This study provides a comparative, multiscope study of the structural transformation of innovation ecosystems in select major U.S. and worldwide metropolitan areas from 1990-2012. Our results reveal distinct patterns of ecosystem formation, growth, and evolution. We complement our findings using an interactive network visualization approach.

Wednesday, October 9

WA: 08:00 - 09:30 Entrepreneurship: Theory and Action

CHAIR: **Sinan Erzurumlu**, Babson College, serzurumlu@babson.edu

Extending the Theory of Entrepreneurial Action to the Context of Disasters

PRESENTING AUTHOR: **Shu-Jung Sunny Yang**, University of Essex, sunnyy@essex.ac.uk
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ABSTRACT: Disasters create recovery opportunities for potential economic, social and environmental value creation. Our model analysis shows in a supply chain that recovery strategies with higher degree of altruism generate higher recovery performance and less variation. Our work extends the theory of entrepreneurial action into the context of disaster.

Leveraging Crowd-sourcing with Working Consumers

PRESENTING AUTHOR: **Meredith Shengli Hu**, University of Southern California, shenglih@usc.edu

ABSTRACT: An increasing number of firms, both multinational giants and start-ups are leveraging crowd-sourcing, the innovative strategy in marketing and operational decisions. We seek managerial insights by analyzing a game between firms and consumers in this context in terms of operational flexibility, demand forecasting and consumer valuation, and further empirically explore intriguing causality in a behavioral way in terms of pricing schemes.

WB: 11:00 - 12:30 Emergent Innovation and Value Creation in Product-Service Systems (PSS)

CHAIR: **James Hazy**, Malardalens University, hazy@adelphi.edu

Using Customer Interactions for Product and Service Innovation in a Telecom Context

PRESENTING AUTHOR: **Athanasios Karapantelakis**, Ericsson, athanasios.karapantelakis@ericsson.com

ABSTRACT: In order to adapt to a transforming telecom industry driven by technological evolution, network providers need to leverage their relationship with customers through personalized offerings. We present a conceptual model describing how customer interactions foster innovation in a telecom context. This framework will identify the different ways customer interactions can facilitate creation of new offerings and will include a number of case studies showing how the model can be used in reality.

Emergent Innovation – Towards a New Paradigm for Innovation Research and Management

PRESENTING AUTHOR: **Erik Lindhult**, Mälardalen University, erik.lindhult@mdh.se

ABSTRACT: Emergent innovation describes value creation as something that can emerge everywhere, and wherein anyone can become an innovator. It assumes that innovation can only partly be formalized in processes, concentrated in specific units, and performed in a planned fashion by innovation experts. This paper argues that the ways in which human interaction dynamics generate emergent innovative structures can be clarified using complex systems models that include nonlinear interactions and processes.

Business Model Innovation in the Cloud

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ABSTRACT: Information and communication technology (ICT) and cloud data change the way innovation occurs in traditional industrial companies. This paper presents a case study in the development of a web platform for enabling service innovation and increased customer interaction in a global industrial company, ABB. It describes a model for how an ICT platform, enables new service oriented business model innovation, increasing value creation for customers and new ways for capturing of value for the company.

Generative Leadership Practices and Value Identification

PRESENTING AUTHOR: **James Hazy**, Malardalens University,

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ABSTRACT: The paper explores specific and differentiated leadership practices that lead to the identification of value creation opportunities. It argues that value identification places two functional demands on organizations which are enacted by leadership: information gathering enables situational awareness and generative activities create relevant information to be recognized and interpreted. A complexity-informed model of these functions is offered and preliminary empirical support is described.

WC: 13:30 - 15:00 Miscellaneous Topics in Technology Management

CHAIR: **Leonardo Santiago**, Federal University of Minas Gerais, Brazil, lsantiago@ufmg.br

Strategic Buckets, Strategic Alignment, and the R&D Portfolio

PRESENTING AUTHOR: **Leonardo Santiago**, Federal University of Minas Gerais, lsantiago@ufmg.br
 CO-AUTHOR: **Veronica Soares**, Federal University of Minas Gerais, soaresvmo@gmail.com

ABSTRACT: Our work aims to offer operational guidelines to the strategic buckets formation. Motivated by a major literature review and an in-depth case research, we further investigate how seven major innovative companies structure their R&D portfolio. We then propose a framework that incorporates the key strategic dimensions that can define the formation of the buckets.

Metrics to Assess and Manage Computer Network Security Technologies

Presenting Author: **Soumyo Moitra**, Carnegie Mellon University, smoitra@sei.cmu.edu

ABSTRACT: To assess the utility of network security technologies, criteria are needed to judge how useful they are for security. We present metrics that are important for security management. A security technology should be judged in terms of how well these metrics can be derived from their outputs. These metrics quantify cyber attack scenarios based on data security technologies should provide. Functional needs for security technologies are related to how they can provide data to estimate these metrics.

Portfolio Management for Cybersecurity Technology Investments

PRESENTING AUTHOR: **Yueran Zhuo**, University of Massachusetts Amherst, yzhuo@som.umass.edu
 CO-AUTHOR: **Senay Solak**, University of Massachusetts Amherst, solak@isenberg.umass.edu

ABSTRACT: Cybersecurity has become an integral component of a firm's business success, and thus investing on cybersecurity countermeasures is an important decision problem for many businesses. We use a portfolio approach to study the optimal cybersecurity investment decisions of a

firm, where the uncertainty of cyber environment is captured through a stochastic programming framework. Results cast managerial insights for cybersecurity investment planning by a firm.

How the Inventors with Independent Inventing Experiences Influence the Other Inventors' Performance

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ABSTRACT: Inventors with independent inventing experiences usually embrace tacit and essential knowledge of innovation. Using Chinese patent data, we show that cooperators can benefit from collaborating with the inventors with independent inventing experiences and this benefit decreases significantly as the distance between them increases. Moreover, the degree of benefit is moderated by the structural non-redundancy of the cooperator and the difference in status between them.

WD: 15:30-17:00 Networks

CHAIR: **Ermin Wei**, Massachusetts Institute of Technology, erminwei@mit.edu

Network Resilience against Epidemic Spread

PRESENTING AUTHOR: **Kimondrakopoulos**, Massachusetts Institute of Technology, kimondr@mit.edu
 CO-AUTHOR: **Asuman Ozdaglar**, Massachusetts Institute of Technology, asuman@mit.edu; **John N. Tsitsiklis**, Massachusetts Institute of Technology, jnt@mit.edu

ABSTRACT: We study the problem of minimizing the expected extinction time of an epidemic that evolves on a graph according to an SIS model. We consider curing policies for the nodes which exploit the knowledge of the current state of the epidemic. We characterize the family of graphs for which it is possible to achieve subpolynomial extinction time and provide a policy that achieves it. Moreover we prove that for all graphs outside this family the expected extinction time is polynomial.

On the $O(1/k)$ Convergence of Asynchronous Distributed Alternating Direction Method of Multipliers

PRESENTING AUTHOR: **Ermin Wei**, Massachusetts Institute of Technology, erminwei@mit.edu
 CO-AUTHOR: **Asuman Ozdaglar**, Massachusetts Institute of Technology, asuman@mit.edu

ABSTRACT: We consider a network of agents that are cooperatively optimizing a problem with separable objective functions and linear coupling constraints. Recent literature studied distributed solutions through either subgradient based methods with slow convergence rate or Alternating Direction Method of Multipliers (ADMM) based methods, which require a synchronous implementation. In this paper, we present a novel asynchronous ADMM based distributed

method and show that it converges at rate $O(1/k)$.

On Threshold Models over Finite Networks

PRESENTING AUTHOR: **Elie Adam**, Massachusetts Institute of Technology, eadam@mit.edu
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ABSTRACT: We study a model for cascade effects over finite networks based on a deterministic binary linear threshold model. We first characterize the limiting behavioral properties of the dynamics. We then study the complexity of decision/counting problems that arise within the context. We finally propose a measure of network resilience that captures the nature of the involved dynamics, prove bounds and investigate the resilience of different network structures under this measure.

Network Volatility

PRESENTING AUTHOR: **Qingqing Huang**, Massachusetts Institute of Technology, qqh@mit.edu

ABSTRACT: We address the problem of identifying the most volatile node in a network. For a networked dynamic system in the presence of exogenous disturbances, we propose a measure of volatility at each node. We show how this measure depends on the structural properties of the underlying network, parameterized by an undirected graph. We investigate some stylized graphs and compare our measure against other measures. We also propose a distributed algorithm to compute the measure for large scale networks.

**New Product Development
 Minneapolis, Minnesota,
 2013
 Sponsored Program
 (October 06 - 09, Sun - Wed)**

Sunday, October 06

SA: 8:00 - 9:30 Learning Issues in Technology and Innovation Management

CHAIR: **Aravind Chandrasekaran**, The Ohio State University, chandrasekaran_24@fisher.osu.edu

Risk, Process Maturity, and Project Performance: An Empirical Analysis of Federal IT Projects

PRESENTING AUTHOR: **Anant Mishra**, George Mason University, amishra6@gmu.edu
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ABSTRACT: Federal IT initiatives are organized in the form of large IT projects that require the coordinated execution of multiple, interdependent tasks, each of which may span diverse knowledge bases. Managing risks in such projects is a matter of serious concern for the government. Using longitudinal data collected from federal IT projects within a global high technology firm, this study identifies project risks and examines the role of process maturity (CMMI) in managing their performance impact.

Fit or Disrupt? A Co-Evolutionary View on Landscape Change and Innovation Strategies

PRESENTING AUTHOR: **Fabian Sting**, Erasmus University, fsting@rsm.nl
 Co-AUTHOR: **Murat Tarakci**, Erasmus University, tarakci@rsm.nl

ABSTRACT: Adaptation scholars have studied firms which perform search to increase their fit with their environments; whereas other researchers have documented firms which disrupt their technology landscape. To explain why firms strive to fit or to disrupt their landscape, we move beyond the current understanding of exogenous landscape changes by incorporating co-evolutionary interactions. Using simulations, we explain the heterogeneity in organizations' innovation strategies with performance objectives.

Title: Adopting Administrative Innovations a Race or Resource?

PRESENTING AUTHOR: **Kevin Linderman**, University of Minnesota, linde037@umn.edu
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ABSTRACT: Companies face pressure to adopt newer technologies and conform to the most up-to-date standards. The "Red Queen Effect" argues that firms achieve superior performance through outpacing their rivals in adopting latest technologies. On the other hand, it could be argued that firms could potentially extract greater value from developing existing standards through the "Organizational Learning Effect". Using longitudinal data of ISO 9001 and ISO 14001 we attempt to reconcile these two perspectives.

SB: 11:00 - 12:30 NPD: From Design to Market

CHAIR: **Gulru Ozkan**, Clemson University, gulruo@clemson.edu

Sell a Pig in a Poke or Let the Cat out of the Bag: Developing, Signaling, Learning and Screening Qu

PRESENTING AUTHOR: **Shouqiang Wang**, Clemson University, shouqiw@clemson.edu
 Co-AUTHOR: **Gulru Ozkan**, Clemson University, gulruo@clemson.edu

ABSTRACT: This paper considers a firm that develops and sells a new experience product, whose quality may not be

observable by the buyer with uncertain perceived quality, and evaluates the quality, pricing and timing strategy of the seller that offers a free time-locked product trial. We synthetically study three informational roles of such a trial program in communicating the product quality: signaling, learning and screening; and their implications on the seller's new product development strategy.

Will Marie Antoinette Eat Bread? Quality Consciousness, Perceived Value and Product Design

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 Co-AUTHOR: **Priyali Rajagopal**, Southern Methodist University, priyalir@mail.cox.smu.edu; **Karthik Ramachandran**, Georgia Institute of Technology, Karthik.Ramachandran@scheller.gatech.edu

Abstract: In this paper, we provide experimental evidence that the perceived quality of a product varies systematically with the quality consciousness of consumers. Specifically, more quality conscious consumers perceive low-end (or, high-end) products to be of even lower (or, higher) quality than less quality conscious consumers. Analytical implications of this new discovery are also explored

Identifying Styles in Product Design

PRESENTING AUTHOR: **Tian Chan**, INSEAD Singapore, tianheong.chan@gmail.com
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ABSTRACT: We introduce an approach to identify styles in product design. We built a theoretical foundation on what a style is and how designs are organized into styles. We then executed a graph-clustering algorithm to identify styles in design patents filed in the USA between 1976 and 2010. Our validation suggests that the algorithm performs no differently from humans. Finally, our analysis on the dynamics of styles suggests that the design world is becoming increasingly turbulent.

New Product Development Evolution: The Search for the Best Alternative

PRESENTING AUTHOR: **Gulru Ozkan**, Clemson University, gulruo@clemson.edu
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ABSTRACT: Using a behavioral approach, we examine the strategy of decision makers who search for the best alternative to develop into a new product. The impacts of facing a set of radical or incremental set of alternatives and the level of time-pressure on the evolution of decision makers' performance are analyzed.

SC: 13:30 - 15:00 Innovation with Crowds

CHAIR: **Joel Wooten**, University of South Carolina, joel.wooten@moore.sc.edu

Finding a Partner in the Crowd

PRESENTING AUTHOR: **Michael Menietti**, Harvard-NASA Tournament Lab, mmenietti@fas.harvard.edu
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ABSTRACT: We ran a large team-formation and matching experiment where participants formed virtual teams of size two, working together over the course of one month to develop an algorithm. We test whether the introduction of a centralized "clearinghouse" based on elicited rankings can improve matching outcomes. While the centralized markets maximized the number of stable pairs, pairs formed in decentralized markets are more likely to produce valid algorithms.

Incentives and Competitive Crowds

PRESENTING AUTHOR: **Yael Grushka-Cockayne**, University of Virginia, GrushkaY@arden.virginia.edu
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ABSTRACT: When individuals are asked to forecast an uncertain quantity, they often face incentives to be the most accurate. Despite the desire to elicit honest forecasts, such competition induces forecasters to report strategically and non-truthfully. The question we address is how incentive schemes influence the accuracy of the crowd's forecast. We show that forecasting competitions may be attractive alternatives to prediction markets because they are easy to implement and may be more accurate.

Incentives and Competition in Unblind Innovation Contests

PRESENTING AUTHOR: **Anant Mishra**, George Mason University, amishra6@gmu.edu
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ABSTRACT: Innovation contests are being widely used by firms to generate creative solutions to complex problems. Using a large panel dataset of unblind innovation contests from an online logo-design platform, we examine the interplay or prize amount and contestant's prior winning experience on the dynamics of competition in unblind innovation contests.

SD: 16:30 - 18:30 Process and Product Design Choices in Furthering Innovation

CHAIR: **Sriram Narayanan**, Michigan State University, narayanan@bus.msu.edu

Collocation Matters: Conformance Quality and the Interdependence of R&D and Manufacturing

PRESENTING AUTHOR: **Enno Siemsen**, University of Minnesota, siems017@umn.edu

CO-AUTHOR: **John Gray**, Ohio State University, gray_402@fisher.osu.edu; **Gurneeta Vasudeva**, University of Minnesota, gurneeta@umn.edu

ABSTRACT: This study investigates the manufacturing conformance quality benefits of collocating manufacturing units with research and development (R&D) activities using a large panel dataset of U.S. based pharmaceutical plants. The benefits of collocation are stable throughout the time period studied, which is surprising given the rapid development of advanced communication technologies in that period. However, the benefits of collocation are contingent on certain firm- and plant-specific characteristics.

Selling New Products to Strategic Customers with Learning Externality

PRESENTING AUTHOR: **Yufei Huang**, University College London, yufei.huang.10@ucl.ac.uk
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ABSTRACT: We study a seller's optimal pricing strategy and capacity decision when selling a new/innovative product to risk-averse customers who are uncertain about their valuations. Customers are strategic, who may deliberately delay their purchase for a lower price or more information from other customers to reduce their valuation uncertainty. We then analyse the effect of learning externality on the seller's pricing strategy and capacity decision.

Product and Supply Base Complexity: Implications for Cost

PRESENTING AUTHOR: **Mark Jacobs**, University of Dayton, majacobs@udayton.edu
 CO-AUTHOR: **Morgan Swink**, Texas Christian University, M.Swink@tcu.edu

ABSTRACT: Explicit and implicit links between product and supply chain structure are suggested in the literature, but to date remain untested empirically. Using primary data from the automotive sector this manuscript investigates the impact of product structural complexity and supply base complexity from the perspective of Transaction Cost Economics. Empirically revealed is the role of agency in prices paid by buyers and the cost implications of product architectural design choices.

Utilization of External Knowledge Resources: How Much Does Firm Scope Matter?

PRESENTING AUTHOR: **Sriram Narayanan**, Michigan State University, narayanan@bus.msu.edu
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ABSTRACT: We examine how firms differ in utilizing partner knowledge resources in high technology industry. We show that the degree to which the focal firm is able to utilize partners technological and knowledge distribution is heterogeneously determined by the scope of firm's own geographic and technological distribution.

Monday, October 7

MA: 08:00 - 09:30 Collaboration in New Product Development

CHAIR: **Svenja Sommers**, HEC Paris, sommers@hec.fr

Effect of Bargaining Power and Information

Asymmetry on Product Quality in Outsourcing

PRESENTING AUTHOR: **Narendra Singh**, Georgia Institute of Technology, Narendra.Singh@scheller.gatech.edu
 CO-AUTHOR: **Stylianos Kavadias**, University of Cambridge, s.kavadias@jbs.cam.ac.uk; **Ravi Subramanian**, Georgia Institute of Technology, ravi.subramanian@scheller.gatech.edu

ABSTRACT: We examine the effect of outsourcing on product quality when the OEM has a backup option of manufacturing the product herself. We characterize the situation as a game-theoretic model consisting of sequential decisions made by the OEM and the contract manufacturer (CM) in two scenarios - the CM offering the contract to the OEM, and vice-versa. We contrast the results for the two scenarios in the absence and presence of information asymmetry about cost structure.

Licensing Contracts: Control Rights and Options

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 CO-AUTHOR: **Pascale Crama**, Singapore Management University, pcrama@smu.edu.sg; **Bert De Reyck**, UCL, bdeyreyc@ucl.ac.uk

ABSTRACT: We investigate how contract structure - payment terms and control rights - influence R&D collaborations. Surprisingly, under certain conditions, the innovator prefers to limit its own actions by granting launch control rights or buy-out options to the marketer. We show that the nature of the effect of R&D effort has a major influence on optimal contract structure. Our results demonstrate that allocation of control rights can have a significant influence on success, quality and profitability.

Benefits and Shortcomings of Flexibility in Collaborative Prototyping

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ABSTRACT: Manufacturers often involve suppliers to develop innovative components. Suppliers in their turn provide manufacturers with several prototypes of the component. We model the sequential prototyping problem as a dynamic non-cooperative game. We examine and compare three schemes of collaboration between manufacturers and suppliers which provide different level of flexibility for manufacturers. We show that under some conditions additional flexibility can be harmful for manufacturers.

MB: 11:00 - 12:30 Environmentally Sustainable Product Design

CHAIR: **Vishal Agrawal**, Georgetown University, va64@georgetown.edu

Design for Recovery or Obsolescence: The Effect of Take-back Legislation

PRESENTING AUTHOR: **Ximin Huang**, Georgia Institute of Technology, ximin.huang@scheller.gatech.edu
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ABSTRACT: We consider a monopolist who has two product design options to manage the end-of-life costs/revenues associated with its products: making products more durable or recyclable. We explore how the recyclability and durability choices are affected by the requirements of take-back legislation.

Improving Supplier Environmental Performance

PRESENTING AUTHOR: **Tim Kraft**, University of Virginia, kraftt@arden.virginia.edu
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ABSTRACT: We examine how a firm can induce higher environmental quality from a supplier under varying cost and market sensitivity conditions. We consider three methods: supplier competition, cost sharing, and revenue sharing. Our research is based on our work with an NGO as it markets to industries a tool to safely share chemical information.

Compliance with Environmental Regulation in Project-based Industries

PRESENTING AUTHOR: **Gokce Esenduran**, Ohio State University, esenduran_1@fisher.osu.edu
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ABSTRACT: We investigate the implications of environmental regulations on project scheduling. We model the decisions of a regulator and multiple project managers (PMs) as a Stackelberg game. The regulator specifies pollution remediation requirements, and the PMs respond either by remediation or by investment in greenness. We describe a subsidy for investment in greenness that coordinates the decisions of the players, and a bonus that ensures truth telling by PMs about their remediation costs.

Economic and Environmental Assessment of Re-manufacturing in Competitive Settings

PRESENTING AUTHOR: **Gal Raz**, University of Virginia, Razg@arden.virginia.edu
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ABSTRACT: This paper provides a data-driven assessment of economic and environmental aspects of remanufacturing under competition. We study a product line competition between two firms: one selling new low- and high-end products and the other selling new and refurbished high-end products. We present an analytical model and a behavioral study which together incorporate demand cannibalization from multiple customer segments and examine the impact of remanufacturing on the firms' competition.

MC: 13:30 - 15:00 Exploring Key Drivers of Innovation at the Level of the Individual, the Organization, and the Crowd

CHAIR: **Jeremy Hutchison-Krupat**, University of Virginia, krupatj@arden.virginia.edu

Risk Taking in Contests

PRESENTING AUTHOR: **Sanjiv Erat**, UCSD, serat@ucsd.edu

ABSTRACT: Innovation contests, with its competitive winner-take-all incentives, has implications to the "riskiness" of outcomes that would be chosen by the contestants. In the current study, a laboratory experiment is presented, and the results are shown to flatly contradict the key prediction of agent's risk behavior in the canonical contest model. Some plausible modifications of the canonical model are explored to reconcile the data.

Implementing Innovation Strategy: The Effects of Organizational Structure and Project Scope

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ABSTRACT: During the project definition (scoping) phase of a project, strategic initiatives are translated into executable objectives. We investigate how the organizational structure, project scope, and performance metrics influence the implementation of innovation strategy. We recognize the dual role of performance metrics: they communicate the project scope (what types of project outcomes are sought), and determine the organizational impetus (effort commitment) from the functional stakeholders.

Leaps in Innovation

PRESENTING AUTHOR: **Joel Wooten**, University of South Carolina, joel.wooten@moore.sc.edu

ABSTRACT: Search for solutions over a landscape of possibilities is central to innovation contests. Here, we look at algorithmic innovation tournaments from Kaggle.com to examine the effect incremental and discontinuous progress has on additional innovation.

Stage Time Reductions in NPD Cycles: Context-Specific Impacts on Market Gains and Strategic Caveats

PRESENTING AUTHOR: **Raul Chao**, University of Virginia, chaor@arden.virginia.edu

CO-AUTHOR: **Elliot Bendoly**, Emory University, Elliot_Bendoly@bus.emory.edu

ABSTRACT: We empirically investigate how time reductions in particular product development stages impact market value. Using longitudinal project data from 107 firms, we compare stage times prior to and following investments in NPD process changes. Our analysis reveals a predominance of focus on time reduction in the late stages of product development, and the existence of an inverted-U relationship between market performance and time reductions for some stages.

MD: 16:30 - 18:00 Innovation with Crowds II

CHAIR: **Joel Wooten**, University of South Carolina, joel.wooten@moore.sc.edu

Innovation Tournaments with Multiple Contributors

PRESENTING AUTHOR: **Ersin Korpeoglu**, Carnegie Mellon University, ekorpeog@andrew.cmu.edu
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ABSTRACT: We study an innovation tournament in which an organizer seeks multiple solutions from agents. While agents exert efforts to improve solutions, their outcomes face technical uncertainty and subjective taste of the organizer. For a large class of distributions, we show a winner-takes-all award scheme is optimal. As participants increase, agents do not necessarily reduce their efforts, and the organizer need not always increase the award. We compare the tournament with individual contracts.

Does Feedback Matter in Crowdsourcing Contests? Theoretical and Empirical Evidences

PRESENTING AUTHOR: **Jiahui Mo**, University of Texas at Dallas, jiahui.mo@utdallas.edu

ABSTRACT: In crowdsourcing contests, a seeker often provides performance feedbacks to solvers. A central problem in crowdsourcing contest is whether feedback matters and how feedback influences solvers' incentives in crowdsourcing contest. This paper builds a theoretical model to investigate the relationship between seeker feedback and solver behavior. Towards the end, using a unique dataset of an online crowdsourcing contest site in China from 2007 to 2010, we empirically test the relationship.

Ambitious Goals and Stretched Resource Allocation: Managerial Biases under Innovation Uncertainty

PRESENTING AUTHOR: **Jaime Andrés Castañeda**, Università della Svizzera italiana (USI, Lugano), castanej@usi.ch
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ABSTRACT: We develop a stylized decision model based on

the Newsvendor problem that incorporates the possibility of either setting ambitious design targets or stretched resource allocations goals. Experimental tests show that decision makers tend to overreact/underreact when costs and uncertainty call for less/more resources or ambitious scopes (pull-to-center effect) and to chase uncertainty thresholds realized in prior innovation efforts (threshold chasing), resembling common inventory-ordering biases.

The Impact of Visibility in Innovation Tournaments

PRESENTING AUTHOR: **Joel Wooten**, University of South Carolina, joel.wooten@moore.sc.edu

ABSTRACT: In innovation tournaments, administrators face a variety of decisions that impact the outcome. We examine the effect of submission transparency on idea quality and uniqueness by comparing blind and unblind contests using field experiments.

Tuesday, October 8

TA: 8:00-9:30 Innovation and New Product Development in Emerging Contexts

CHAIR: **Anant Mishra**, George Mason University, amishra6@gmu.edu

Protecting the Confidentiality of Shared Information: The Effects of Location

PRESENTING AUTHOR: **Brett Massimino**, The Ohio State University, massimino.3@osu.edu
 CO-AUTHOR: **Ken Boyer**, The Ohio State University, boyer.9@osu.edu; **John Gray**, The Ohio State University, gray.402@osu.edu

ABSTRACT: We examine the effects of location-related factors on the confidentiality of product-level information in a distributed product development context. We introduce a novel measure of information confidentiality, and account for client, vendor, dyadic, and product characteristics in our analyses. Unique data is obtained through the web-crawling of underground, black-market distribution servers in the video game industry.

Product Reuse in Industries with Radical Innovations

PRESENTING AUTHOR: **Vedat Verter**, McGill University, vedat.verter@mcgill.ca
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ABSTRACT: We study how a firm's decision of whether or not to reuse products is influenced by innovations taking place in the industry, especially when these innovations are not only incremental in nature, but there is also a chance that a radical innovation will take place, thereby changing consumer's valuations of reused products, which do not contain this radical innovation. A Markov decision process is used

to model the firm's various decisions.

Control, Capability and Cost in Outsourcing

PRESENTING AUTHOR: **Cheryl Druehl**, George Mason University, cdruehl@gmu.edu
 CO-AUTHOR: **Gal Raz**, University of Virginia, Razg@darden.virginia.edu

ABSTRACT: We study the impact of control (decision rights on design/process innovation effort), capability (who is better at innovation), and innovation cost on outcomes. We consider outsourcing manufacturing/process innovation or outsourcing design/process innovation/manufacturing. With wholesale price contracts, the buyer never outsources both design/manufacturing. With a two-part tariff, the buyer outsources both design/manufacturing if the supplier is better in one factor and equal in the other two.

TB: 11:00-12:30 New Product Development I: Technology Selection and Innovation

CHAIR: **Amir Sanayei**, Wayne State University, sanayei@wayne.edu

Incentive Scheme for Globally Dispersed Product Development Teams

PRESENTING AUTHOR: **Sara Rezaee Vessal**, HEC Paris, sara.rezaee-vessal@hec.edu
 CO-AUTHOR: **Svenja Sommers**, sommers@hec.fr

ABSTRACT: To successfully compete on an international scale, companies increasingly turn towards globally dispersed product development teams, both to draw on a diverse set of expertise and to access more accurate local market knowledge. However, these teams also face additional challenges in terms of coordination and differences in objectives. In this study, we address the question how to design incentive schemes to achieve the firm's global objectives.

Flexibility and Risk Management in Collaborative Product Development

PRESENTING AUTHOR: **Suri Gurumurthi**, UNC Kenan-Flagler Business School, Suri_Gurumurthi@kenan-flagler.unc.edu

ABSTRACT: Risk in collaborative innovation projects arises from multiple sources: uncertain task requirements, resource capabilities, inadequate partner investments, and eventually market demand. We measure the relative impact of these sources of risk on PD performance, and identify sound risk management principles that leverage and plan for flexibility in the PD environment.

Optimal Product Design Strategy: The Role of Component Sharing and Concurrent Engineering

PRESENTING AUTHOR: **Yufei Huang**, University College London, yufei.huang.10@ucl.ac.uk
 CO-AUTHOR: **Bilal Gokpinar**, University College London, b.gokpinar@ucl.ac.uk

ABSTRACT: Component sharing and concurrent engineering are two popular design strategies for many product development firms. We study the interplay between these two strategies and propose an analytical model to find the optimal concurrency level to minimize both short term and long term costs. We then empirically test our model using data from automotive industry.

Tacit Knowledge and Product Innovation in the Multinational Corporation

PRESENTING AUTHOR: **Margaret Sheng**, National Taiwan University of Science and Technology, msheng@mail.ntust.edu.tw

ABSTRACT: Our study applies a contingent perspective to examine how the social cognition influences the relationship between tacit knowledge and product innovation of multinational corporations (MNCs). It focuses on social cognition as a potential enhancement of the MNC's ability to convert tacit knowledge into product innovation. The results show that the effect between tacit knowledge and product innovation is stronger for higher levels of organic structure, trust, and self-efficacy.

Technology Selection and New Product Development in a Competitive and Uncertain Environment

PRESENTING AUTHOR: **Amir Sanayei**, Wayne State University, sanayei@wayne.edu
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ABSTRACT: Technology selection is one of the most important decisions made in new product development process that can critically affect product success factors. Although new prospective technologies can bring more competitive advantage by offering higher performance comparing with old and proven technologies, but could also be riskier. In this paper, we developed a model to select best technology choices in different design scenarios and investigate effects of uncertainty in a competitive market environment.

TC: 13:30 - 15:00 New Product Development II: Testing, Adoption, and Optimization

Chair: **Hongyi Chen**, University of Minnesota Duluth, honchen@d.umn.edu

Wireless Wearable System for Monitoring of Sleep Apnea and Other Cardiorespiratory Disorders

PRESENTING AUTHOR: **Woranat Wongdhamma**, Oklahoma State University, woranat@okstate.edu
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ABSTRACT: This paper reports the development of a wireless, wearable, multi-sensor suite for diagnosis cardiorespiratory disorders with a particular focus on sleep ap-

nea screening. The suite is designed to synchronously gather 3-lead VCG signals, heart sound signals, digitized oxygen saturation signals, and respiratory signals. The signals are transmitted to a processing and visual graphic unit via a Bluetooth module. The system can serve as an out-of-center Type III sleep apnea screening device.

Multi-stage Testing in New Product Development (NPD)

PRESENTING AUTHOR: **Fang Cui**, Xi'an Jiaotong University, 15091054888@139.com
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ABSTRACT: Testing is essential and multi-stage design mode is popular in NPD. Previous studies often ignore two typical features of multi-stage design process (MDP). This paper presents an analytical model for scheduling of tests in MDP. We derive optimal stopping rules for each stage testing and the impact of different model parameters, such as redesign cost, the reliability between upstream and downstream, problem-solving capacity, opportunity cost, and the level of quality on the optimal solution.

Optimizing the Technology Development Paths by Incorporating the Switching Costs into the TDE Model

PRESENTING AUTHOR: **Hongyi Chen**, University of Minnesota Duluth, honchen@d.umn.edu
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ABSTRACT: Technology Development Envelope (TDE) helps companies identify technology development paths containing technologies that rank the highest in each concerned time period based on experts' judgment and technology forecast. As this approach does not consider the cost involved when the R&D and manufacturing switch from the current technology to another highly ranked technology, an optimization model is proposed to generate optimal development path(s) by including manufacturing and switching cost.

Managerial Decision Support Tool - R Package for Technology Forecasting & Product Evaluation

PRESENTING AUTHOR: **Tom Shott**, Portland State University, tom.n.pdx@gmail.com
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ABSTRACT: TFDEA (Technology Forecasting using Data Envelopment Analysis) analyzes and forecast technology trends based on a product's key performance attributes. A recently released R package makes this emerging methodology broadly accessible. This talk focuses on using the approach to provide additional management insight from independent data driven analysis. It demonstrates using the software for forecasting technology and industry trends, new product planning and project risk evaluation.

TD: 16:30 - 18:00 New Product Development III: Customer Interaction

CHAIR: **Xin Xu**, Rutgers University,
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Determiners of User-firm Collaboration Network Performance in CT Scanner

PRESENTING AUTHOR: **Yutaka Hamaoka**,
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ABSTRACT: Analyzing the Japanese patent data for a CT scanner whose users are highly knowledgeable doctors, this research examines the determiners of the creation and diffusion of innovation. Based on the stickiness of information theory (von Hippel, 1994) and the structural hole theory (Burt, 1992), a set of hypotheses is proposed. They are empirically tested with Japanese patent data.

Diagnosis of Customer Preference for BTO Products

PRESENTING AUTHOR: **Yuji Sato**, Chukyo University,
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ABSTRACT: This paper studies a diagnosis procedure of new BTO products which takes into user's preference for the system for a manufacturing company. This paper addresses this issue by combining cost-benefit analysis evaluating potential treatment system, and the AHP quantifying subjective judgment in evaluations. A case study is carried out to demonstrate the applicability of the proposed approach.

An Empirical Analysis of the Role of Customer Interaction in Project Crowdfunding

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CO-AUTHOR: **Bilal Gokpinar**, University College London,
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ABSTRACT: Companies increasingly involve customers in their product development efforts. Customer interaction during new product development (NPD) projects can be a valuable contribution as well as a jeopardous threat to project outcomes. Using large-scale data set, we investigate such tensions surrounding customer interaction in a project crowdfunding environment.

Partnerships In Project Management

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ABSTRACT: We consider a product development project where the design work of subsystems is outsourced to suppliers. We build a mathematical model to predict each firm's behavior under loss sharing partnership. We show each firm tends to delay its task relative to what is the best for the entire project as a whole.

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