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PICMET '10

PICMET

Dear PICMET Guests:

It is a great pleasure for us to welcome you to PICMET '10.

As the worldwide economic crisis starts to ease, countries, industries and companies are preparing for the recovery that will follow the difficult times they experienced over the last few years. As it has always been in the past, the current economic slowdown is expected to give way to a new cycle of economic growth. Technology will not be the only force behind that growth, but it will surely be a major engine in that process.

PICMET defines the primary role of Technology Management as the management of technologies to assure that they work for the betterment of humankind. In the spirit of this definition, technology management will have a critical role to play as the world rebuilds its economic strength in the aftermath of the current slowdown. It will be the responsibility of the Technology Management community to utilize and guide technology effectively to provide the world with the framework to recover from the economic crisis and to move continuously toward better futures through innovation and technology development.

This is a big challenge for the leaders and emerging leaders in the Technology Management field. Recognizing this challenge, the PICMET '10 Conference focuses on the role of technology management in the engine behind building global economic growth.

A total of 709 submissions were received by PICMET '10. After they were reviewed by at least one referee from the 130-member Program Committee in a double-blind refereeing process, 330 were accepted for inclusion in the conference. The referees are from universities, industrial organizations and government agencies from around the world. The authors represent about 300 organizations in 39 countries.

The PICMET '10 Conference has two outputs:

This ***Conference Bulletin*** includes an up to 200-word abstract of each paper to enable the participants to select the sessions to attend and the presentations to follow. The *Bulletin* is intended as a reference book for an overview of the field, in general, and the conference, in particular.

The ***Proceedings*** is a CD-ROM containing full-length presentations included in the conference. Its purpose is to give full access to the entire conference for many years after the conference is over. The *Proceedings* is divided into 49 sections, listed below.

- **Technology Management Framework**
- **Strategic Management of Technology**
- **Science and Technology Policy**
- **Technology Forecasting**
- **Technology Marketing**
- **Globalization of Technology**
- **Intellectual Property**
- **Entrepreneurship/Intrapreneurship**
- **Innovation Management**
- **Collaborations for Technology Management**
- **Competitiveness**
- **Decision Making**
- **Emerging Technologies**
- **Disruptive Technologies**
- **Information Technology**
- **Information Management**
- **Knowledge Management**
- **New Venture Management**
- **Project/Program Management**
- **Software Process Management**
- **Quality Management**
- **R&D Management**
- **Manufacturing Management**
- **New Product Development**
- **Enterprise Management**
- **Outsourcing**
- **Technology Roadmapping**
- **Technology Assessment and Evaluation**
- **Technology Adoption and Diffusion**
- **Technology Transfer**
- **Technical Workforce**
- **Patent Analysis**
- **Social Network Analysis**
- **Sustainability**
- **E-Business**
- **Supply Chain Management**
- **Education**
- **Cultural Issues**
- **Environmental Issues**
- **Global Issues**
- **RFID Applications for Technology Management**
- **Technology Management in Aerospace Industry**
- **Technology Management in Automotive Industry**
- **Technology Management in Semiconductors Industry**
- **Technology Management in Telecommun. Industry**
- **Technology Management in Defense Industry**
- **Technology Management in Energy Industry**
- **Technology Management in Health Industry**
- **Technology Management in Service Industry**

A large number of colleagues in Thailand contributed to the success of PICMET '10. Dr. Ekachai Leelarasmee of Chulalongkorn University served as a Program Co-Chair for the Conference. The Local Arrangements Committee (LAC) formed by the Technology Management leaders in Thailand's government, universities, and industry provided the much needed help in coordinating the local activities for more than a year.

PICMET '10

Under the able leadership of NECTEC (National Electronics and Computer Technology Center), the LAC became the liaison between the PICMET headquarters and the local sponsors, vendors, suppliers and service providers.

The LAC consisted of the following colleagues.

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Dr. Boonkiart Tewwongchareon, KMUTT

The PICMET Board of Directors set the strategic direction; the Advisory Council provided guidance for the implementation of the strategies for the conference.

Ann White coordinated the overall planning for PICMET '10; Liono Setiowijoso designed, maintained and managed the information systems, and formatted the papers for the *Proceedings*; Kenny Phan managed the registration process; Inthrayuth Mahaphol and Songphon Munkongsujarit coordinated the onsite activities; and Jeff Birndorf of endesign developed graphic arts for the conference.

Vince Reindl and John Schipper of Omnipress worked with PICMET from the beginning to the end of the conference planning effort. Their professionalism and superb expertise assured the high quality production of the PICMET *Proceedings* on schedule.

The Country Representatives, under the leadership of Kiyoshi Niwa of the University of Tokyo and Dilek Cetindamar of Sabanci University, provided linkages between PICMET and the regions they represented. The Program Committee reviewed the papers and provided valuable assistance to assure the highest quality of presentations.

The members of the Program Committee who reviewed the papers in a double-blind refereeing process were Mustafa Abbas, Remal H. Abotah, Fatima M. Albar, Richard Albright, Fahad Aldhaban, Muhammad Amer, Hacer Ansal, Nuri Basoglu, Nima A. Behkami, Rian Beise-Zee Jerry Bell, Caroline Benton, Daniel Berg, John Bers, Nametsegang Boemo-Mokhawa, Sakoon Boon-It, Ricarda Bouncken, Greg Bourque, Akif A. Bulgak, Fethi Calisir, Lawrence D. Carter, Paul Carter, Dilek Cetindamar, C. M. Chang, Leong Chan, Shann-Bin Chang, Yu-Shan Chen, Byung Chul Choi, Mario M Coccia, Darin G. Colby, Kelly R. Cowan, Scott W Cunningham, Clive-Steven Curran, Greg Daneke, Haluk Demirkan, John P. Dismukes, Robert Dryden, William (Ike) Eisenhauer, Judith Estep, M. Hosein Fallah, Asser Fayed, Eliezer Geisler, Nathasit Gerdsri, Pisek Gerdsri, Anatole Gershman, Clandia M. Gomes, Stuart Graham, Cory Hallam, Georgina Harell, Robert R. Harmon, Ted R. Heidrick, Jonathan C. Ho, Hui-Ying Hsu, Boonkiart Iewwongcharoen, Kazuhiko Itaya, Ryan Jefferis, Antonie J. Jetter, Shimei Jiang, Yuya Kajikawa, Sul Kassicieh, Gulgun Kayakutlu, Ron Khormaei, Jisun Kim, Alisa Kongthon, Diana Laboy-Rush, Ann-Marie J. Lamb, Scott A. Leavengood, Jaegul Lee, Matthew J. Liberatore, Justin Lin, Marwan Lingga, Ying Liu, Inthrayuth Mahaphol, Hilary T. Martin, Bart Massey, Mary Mathew, Nitin Mayande, Helen Millward, Caroline Mudavadi, Songphon Munkongsujarit, Paul Newman, Wuttigrai Ngamsirijit, Kiyoshi Niwa, Tomohiro Ohta, Atilla M. Öner, Cagla Ozen Seneler, Toryos Pandejpong, Athar Pasha, Peerasit Patanakul, Wendy Peterman, Phallapa Petison, Robert Phaal, Kenny Phan, Tipawan Pinvanichkul, Pattravadee Ploykitikoon, Leon Pretorius, Prattana Punnakitikashem, Meghana Rao, Jamie Rogers, Rene Rohrbeck, Guillermo Rueda, Samar K. Saha, Rosine H. Salman, Leonardo P. Santiago, Marko Seppanen, Siri-on Setamanit, Nasir Sheikh, Kunio Shirahada, Harm-Jan Steenhuis, Frank Steiner, Fang-Pei Su, Yulianto Suharto, Patt Suntharasaj, Attawit Techawiboonwong, Ilknur Tekin, Alfred Thal, Hans J. Thamhain, Poomporn Thamsatitdej, Thien A. Tran, Bi-Huei Tsai, Cornelis C. van Waveren, Bing Wang, Kelly Waugh, Charles M. Weber, Calvin S. Weng, David Wilemon, Gerry Williams, Jiting Yang, Deok Soon Yim, and Wilson Zehr.

We acknowledge the support of all of these colleagues and hundreds of others who contributed to PICMET's success, and express our gratitude to all.

We also offer special thanks to Portland State University's President Wim Wiewel and Dean Renjeng Su of the Maseeh College of Engineering and Computer Science for their continuous support and encouragement.

We believe the PICMET '10 *Bulletin* and this *Proceedings* contain some of the best knowledge available on Technology Management for addressing the challenges and opportunities in a world going through fundamental changes. We hope they will contribute to the success of technology managers and emerging technology managers throughout the world.

Dundar F. Kocaoglu
President and CEO, PICMET

PICMET ’10

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Dr. Boonkiart Tewwongchareon, KMUTT

PICMET ’10

PROGRAM COMMITTEE

The Program Committee consisted of 130 researchers, educators, practitioners and students of Technology Management from around the world. The members of the Program Committee evaluated the abstracts, reviewed the papers, and made recommendations on the appropriateness of each presentation for inclusion in the conference.

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Fahad Aldhaban
Muhammad Amer
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David Wilemon
Gerry Williams
Jiting Yang
Deok Soon Yim
Wilson Zehr

PICMET '10

ADVISORY COUNCIL

The International Advisory Council provides advice and counsel on the strategic directions of PICMET and the identification of the critical issues of technology management that are addressed at the conference. The members are listed below.

Dr. Daniel Berg, Professor and former President, RPI – USA

Dr. Frederick Betz, Adjunct Professor, Portland State University – USA

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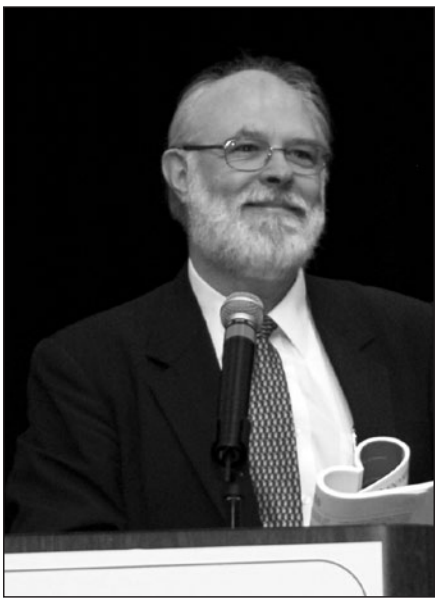

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We define "**PICMET Experience**" as

"Joining the world's leading technology management experts from academic institutions, industrial corporations and government agencies for discussions on cutting-edge topics."

STUDENT PAPER AWARD

OUTSTANDING STUDENT PAPER AWARD

The number of students doing significant research in the area of Engineering and Technology Management was demonstrated by the number of nominations received. The selection of the award winner was difficult because of the excellent quality of all the submissions, but one paper stood out for its contributions to the field of Engineering and Technology Management.

AUTHOR

Hung-Chun Huang

ADVISOR & CO-AUTHOR

Dr. Hsin-Yu Shih

UNIVERSITY

National Chi Nan University, Taiwan

PAPER TITLE

"Constructing National Innovative Capacity in Globalization: The Network Autocorrelation Perspective"

ABSTRACT

Globalization has highlighted change in national technology capability. Exogenous factors drive a country towards technological progress, and drive economic growth via international technology diffusion. Previous studies have stressed that innovative capacity is determined by regional or local social systems. This paper reconsiders these studies and develops a new perspective of evaluating national innovative capacity. This method employs a network autocorrelation model which simultaneously considers both endogenous determiners and exogenous influence on national innovative capacity. Data from 42 countries from 1997 to 2002 are utilized to empirically examine their network relationship and innovation performance. The analytical results demonstrate the effect of domestic determiners within a global context and show that their differential context attribute influence on national innovative performance is influenced more by network positioning than by network partnership. They furthermore exhibit important differences between the alternate channels of international technology diffusion and their differential effects on innovative performance. This finding provides a new perspective for science and technology policy makers.

MEDAL OF EXCELLENCE

MEDAL OF EXCELLENCE

Initiated at PICMET '04 in Seoul, Korea, the Medal of Excellence award is given for extraordinary achievements of individuals in any discipline for their outstanding contributions to science, engineering and technology management.

The 2004 recipients were Dr. Daeje Chin, Minister of Information and Communications, Seoul, Korea; Dr. Kiyoshi Niwa, Professor in the Department of General Systems Studies at the University of Tokyo, Japan; and Rosalie A. Zobel, Director of Components and Systems in the Information Society and Media Directorate-General of the European Commission. The 2005 recipient was Bob Colwell, President, R & E Colwell and Associates, and former Fellow, Intel Corporation. In 2006, the awardees were Dr. Frederick Betz, Former Program Officer, NSF; Dr. Fariborz Maseeh, Founder and President, The Massiah Foundation; and Dr. T. Nejat Veziroglu, Director, Clean Energy Research Institute, University of Miami. The 2007 recipient was Mihail C. Roco, National Science Foundation (NSF), National Nanotechnology Initiative (NNI), and International Risk Governance Council (IRGC), USA. The 2009 recipient was Dr. Albert H. Rubenstein, Founder and President, International Applied Science and Technology Associates (IASTA); and Professor Emeritus, Industrial Engineering and Management Sciences, Northwestern University.

PICMET '10 AWARDEES

Kiran Mazumdar-Shaw
Chairman and Managing Director, Biocon Limited, India

A successful technocrat of global standing, Kiran Mazumdar-Shaw heads India's leading biotechnology enterprise, Biocon. She is highly respected in the corporate world and has recently made it to the 2010 *Time* 100 list of The World's Most Influential People. Her pioneering efforts in biotechnology have drawn global recognition both for Indian industry and Biocon.

After completing her Bachelor of Science degree in Zoology from Bangalore University in 1973, she went to Ballarat Institute of Advanced Education (now University of Ballarat), Australia, to study brewing and qualified as a master brewer in 1974. Kiran Mazumdar Shaw started her professional career as trainee brewer in Carlton & United Beverages in 1974. In 1978, she joined as a Trainee Manager with Biocon Biochemicals Limited in Ireland. Collaborating with the same Irish firm, she founded Biocon India in 1978.

Ms. Shaw chairs Karnataka's Vision Group on Biotechnology and also served on the Board of Science Foundation, Ireland. She presently serves on the Advisory Council of the Government's Department of Biotechnology, where she has been instrumental in bringing government, industry and academia together to chart a clear and progressive growth path for biotechnology in India. She is also part of the Prime Minister's Council on Trade and Industry in India and the US-India CEO Forum. Ms. Shaw also serves as Member, Governing Body and General Body, of the Indian Pharmacopoeia Commission, an autonomous body of the Government of India. She is also a founder member of the society for the formation of "Institute for Stem Cell Biology and Regenerative Medicine." Ms. Shaw has most recently been nominated as Member of the Board of Trade, Directorate General of Foreign Trade, Ministry of Commerce and Industry.

Ms. Shaw is the recipient of several prestigious awards including the Nikkei Asia Prize 2009, for Regional Growth; Express Pharmaceutical Leadership Summit Award 2009 for Dynamic Entrepreneur; the Economic Times "Businesswoman of the Year"; the Veuve Clicquot Initiative for Economic Development for Asia; Ernst and Young's Entrepreneur of the Year Award for Life Sciences and Healthcare; "Technology Pioneer" recognition by the World Economic Forum; and the Indian Chamber of Commerce Lifetime Achievement Award. Her most cherished awards are the national awards, PADMASHRI (1989) and PADMA BHUSHAN (2005), presented to her by the President of India, for her pioneering efforts in industrial biotechnology.

Prof. Dr. Nuket Yetis
President, Scientific and Technological Research Council of Turkey (TÜBITAK)

Prof. Dr. Nuket Yetis is President of the Scientific and Technological Research Council of Turkey (TÜBITAK) since August 2008; she was Acting President from 2004-2008. Her initiation of a thorough restructuring translated into an over 33-fold increase in financial support provided to universities as well as private and public research institutes within the Turkish Research Area in 2006 compared to 2003, while the number of TÜBITAK employees increased only 6 percent. The overall support increased more than five-fold while the granted fellowships and scholarships

MEDAL OF EXCELLENCE

displayed an even sharper increase. Among other tangible results were doubled revenues for TÜBITAK's own research institutes through their products and services.

Prof. Dr. Yetis was director of the Turkish Institute for Industrial Management from 2000-2003. During her tenure there, she led management reform and restructuring projects for more than 75 organizations, the number of employees increased 40 percent, and operational revenues increased 20-fold. The Institute logged a 110 percent financial self sufficiency in 2002.

She was Dean of Marmara University's Faculty of Engineering (MUFE) from 1994-2000. She led Continuous Quality Improvement activities at MUFE, making it the first Turkish public organization to become a finalist for the European Quality Award in 2000. MUFE was the first applicant and finalist for the European Quality Award in higher education.

Prof. Dr. Yetis was Associate Dean of Marmara University's Faculty of Engineering from 1990-1994. She has been among the leading founders of the Faculty of Engineering, and she established master's and doctoral programs in Engineering Management. She was Assistant Professor in the Department of Business Administration, Marmara University Faculty of Economics and Administrative Sciences, from 1985-1989; and she was an instructor in the Department of Industrial Engineering at Istanbul Technical University from 1982-1985.

Prof. Dr. Yetis received the Ph. D. in Industrial Engineering from Istanbul Technical University, and an MBA in Operations Management and B.S. in Chemical Engineering from Bosphorus University.

LTM AWARDS

LEADERSHIP IN TECHNOLOGY MANAGEMENT AWARDS

PICMET's Leadership in Technology Management (LTM) award recognizes and honors individuals who have provided leadership in managing technology by establishing a vision, providing a strategic direction, and facilitating the implementation strategies for that vision.

Past recipients include Dr. Andrew S. Grove, CEO of Intel—USA; Norman Augustine, Chairman of Lockheed Martin—USA; Jack Welch, CEO of General Electric—USA; Dr. Richard M. Cyert, President of Carnegie Mellon University—USA; Dr. Modesto A. Maidique, President of Florida International University—USA; Ms. Carleton S. Fiorina, Chairman and CEO of Hewlett-Packard Co.—USA; Ms. Donna Shirley, Manager of the Mars Exploration Program—USA; Mr. Jong-Yong Yun, Vice Chairman and CEO of Samsung Electronics, Inc.—Korea; Dr. Joseph Bordogna, Deputy Director of the National Science Foundation (NSF)—USA; Dr. Chun-Yen Chang, President of National Chiao Tung University—Taiwan; Dr. Kwan Rim, Chairman of Samsung Advanced Institute of Technology (SAIT)—Korea; Dr. Gunnar Hambraeus, member of the Swedish Royal Academy of Science and former President and Chairman, Royal Swedish Academy of Engineering Sciences—Sweden; Dr. Morris Chang, Founding Chairman, Taiwan Semiconductor Manufacturing Company Ltd. (TSMC)—Taiwan; Dr. Pairash Thajchayapong, Permanent Secretary, Ministry of Science and Technology—Thailand; Dr. Eric von Hippel, Professor and Head of the Technological Innovation and Entrepreneurship Group, Sloan School of Management, Massachusetts Institute of Technology—USA; Prof. Dr.-Ing. Dr. Sc. h.c. Bacharuddin Jusuf Habibie, former President, Indonesia, and founder and chairman, The Habibie Center—Indonesia; Dr. Youngrak Choi, Chairman, Korea Research Council of Public Science & Technology (KORP)—Korea; Dr. Tsuneo Nakahara, Adviser to CEO (past Vice Chairman) of Sumitomo Electric Industries, Ltd.—Japan; Dr. Mehmet Nimet Ozdas, Dept. of Mechanical and Control Engineering, Istanbul Technical University—Turkey; Dr. Edward B. Roberts, David Sarnoff Professor of the Management of Technology and Chair, Massachusetts Institute of Technology (MIT) Entrepreneurship Center—USA; Dr. Harold

LTM AWARDS

A. Linstone, Editor-in-chief, *Technological Forecasting and Social Change*, University Professor Emeritus, Systems Science, Portland State University—USA; Dr. Yoshio Nishi, Director of Research of the Stanford Center for Integrated Systems, Director of the Stanford Nanofabrication Facility, and Research Professor in the Department of Electrical Engineering at Stanford University—USA; William P. Venter, Chairman, Allied Electronics Corporation Limited—South Africa; and Gideon de Wet, Professor Emeritus, University of Pretoria—South Africa; Dr. Klaus Brockhoff, Professor, Otto Beisheim School of Management, Germany; Anne M. Mulcahy, Chairman and Former CEO, Xerox Corporation—USA; and Prof. Muhammad Yunus, Managing Director, Grameen Bank—Bangladesh.

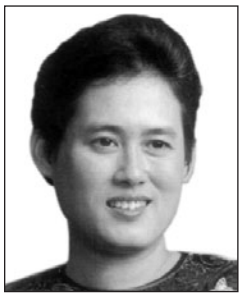
PICMET '10 AWARDEE:

HRH Princess Maha Chakri Sirindhorn

Her Royal Highness received a Bachelor of Arts Degree (First Class Honor), with a major in History and minor in Pali-Sanskrit and Thai. She received a Master of Arts degree in Oriental Epigraphy in 1979 from Silpakorn University. At the same time, she studied at Chulalongkorn University, where she earned a Master of Arts degree in Pali-Sanskrit in 1981. In 1986 she received a doctorate degree in Development Education from Srinakharinwirot University.

Her Royal Highness began her teaching career in 1979, when she started teaching general education at Chulalongkorn University. A year later, she joined the Department of Law and Social Sciences, in the Academic Division of Chulachomklao Royal Military Academy. At present she is Director of the Department of History at the Academy, where she has played an important role in revising its curriculum. She supervises the Thai Music Club of the Academy. She gives lectures at several other institutions, and she regularly attends academic conferences and seminars both in Thailand and abroad.

Besides her main duty at the Military Academy, she also works on other functions, mostly concerned with development and philanthropic works. Her projects mostly focus on education, food and nutrition to provide basic life necessities for people who are in need. In her development work, she has used technologies such as IT, biotechnology, agricultural science, medicine and public health widely to enhance livelihood and well-being of the Thai people, particularly those in the remote areas: people with disabilities, prison inmates, victims of natural disasters, minority groups and other marginalized populations. She has engaged in technology integration and management in practice in many of those projects in order to achieve the desired outcomes.



Her Royal Highness is active in several philanthropic organizations and foundations. She has been Executive Vice President of the Thai Red Cross Society since 1977. She has been Executive Chairman of the Chaipattana Foundation since 1988 (in charge of His Majesty the King's development and environmental preservation projects), of Ananda Mahidol Foundation since 1995 (to promote higher education), and of King Rama II Foundation since 1977 (to conserve and promote Thai cultures). She has been the President of Sai Jai Thai Foundation since 1975 (to support disabled veterans), and of Prince Mahidol Award Foundation since 1992 (to award prizes annually to members of the international community for outstanding performances in the fields of medicine and public health). She was the Advisor to the Committee of the Thai Junior Encyclopedia Project by Royal Command of His Majesty the King. She is the chairperson of the Information Technology Project Committee (ICT Fund) under the Initiatives of HRH Princess Maha Chakri Sirindhorn since 1995.

In addition, she contributes a great deal to international organizations. For example, she is Special Technical Advisor on Health of Marginalized Populations for the Southeast Asian and the Western Pacific Regions World Health Organization; Honorary Committee Member, the Health Advisory Board, Bloomberg School of Public Health, Johns Hopkins University; a Trustee of the Council of Refugee Education Trust; Special Ambassador of the United Nations World Food Program for School Feeding; and UNESCO Goodwill Ambassador (Ethnic Children Education).

She has received international awards and positions such as Ramon Magsaysay (Public Service, 1991), Indira Gandhi (Peace, Disarmament and Development, 2004), International Telecommunication Union (Helping People with Disabilities using ICT, 2006), and International Union of Nutritional Sciences (Nutrition Improvement to Development of the Disadvantaged Population, 2009). She speaks Thai, English, French, Chinese, and some German.

General Information

CONFERENCE FOCUS

The year 2010 was the year of economic slowdown due to the financial crisis throughout the world. The crisis is far from over yet, but there are signs of optimism that we might start seeing the light at the end of the tunnel over the next 12 months. As the world prepares for a rise from the ashes of the crisis, the new and emerging technologies are being positioned to fuel the rebirth of the economic strength, worldwide.

It is the responsibility of the Technology Management community to guide technology effectively for the betterment of humankind, and to lead it for the rebuilding of economic growth at the company, industry and national levels. This is a tall order for the leaders and emerging leaders in the Technology Management field, but it is critical that they accept the responsibility and meet the challenges head on. That is the focus of the PICMET '10 Conference. The role of Technology Management for Global Economic Growth is highlighted throughout the conference.

WHO SHOULD ATTEND

Following the PICMET tradition, this high-impact conference will set the stage for innovation management for decades to come. The world's leading experts from academic institutions, industrial corporations and government agencies will participate in the discussions. PICMET '10 is essential for

- Presidents and CEOs of technology-based corporations
- Vice presidents of engineering, R&D and technology in industrial organizations
- R&D managers
- Engineering, manufacturing, operations, quality and marketing managers in technology-based organizations
- Project and product managers
- Information systems managers in industrial and service organizations
- Technology management researchers
- Educators in engineering management, technology management, manufacturing management, technology marketing, software management, information systems management, project management, and technology-focused MBA programs
- Engineering and technology management program heads
- Students in engineering management, management of technology and related programs
- Government officials responsible for technology policy
- Government officials responsible for science and technology programs
- Engineers and scientists moving from a technical specialty to management positions while maintaining their identity in technical fields

PROGRAM

The PICMET '10 program consists of

- Plenary sessions by global leaders from industrial corporations, academic institutions and government agencies
- Research papers by cutting-edge researchers
- Applications papers by researchers and practitioners working on industry applications
- A Ph.D. Colloquium, "Getting Your PhD and Beyond," Wednesday, July 21, 13:00—16:30, in Arcadia Hall 2
- Tutorials on select topics by authorities in the field

PUBLICATIONS

There are two publications at PICMET '10:

- The "Bulletin" containing the abstracts of each presentation
- The "Proceedings" containing all of the papers on CD-ROM

The publications are available to PICMET '10 attendees at the registration desk.

REGISTRATION POLICY

All PICMET attendees, including speakers and session chairs, must register and pay the registration fee to have access to sessions and other events. The registration fee allows admittance to all technical session and social events.*

Name badges must be worn to all PICMET sessions, functions and events. If you attend other events not covered by the registration fee, you will be required to pay an additional fee.

** The one-day and student registration fees do not include the evening social events.*

GENERAL INFORMATION

SESSION AND PAPER DESIGNATIONS

Sessions are identified by a four-digit code as follows:

First digit shows the day	M: Monday T: Tuesday W: Wednesday H: Thursday
Second digit shows the time	A: 08:00-9:30 B: 10:00-11:30 C: 11:30-13:00 D: 13:00-14:30 E: 15:00-16:30 F: 17:00-18:30
Third and fourth digits show the room	01: Ballroom A 02: Ballroom B 03: Similan 1 04: Similan 2 05: Arcadia Hall 1 06: Arcadia Hall 2 07: Lagoon Hall 1 08: Lagoon Hall 2 09: Business Center

Presentations in each session are given consecutive numbers following the session number. For example, paper TD-05.2 is the second paper on Tuesday at 13:00 – 14:30 in Arcadia Hall 1.

PRESENTATION GUIDELINES

SESSION GUIDELINES

The sessions are 90 minutes long and include two, three, or four papers. Depending on the number of papers in the session, the time should be divided equally for each presentation, allowing about five minutes after each one for questions.

SESSION CHAIR GUIDELINES

If you are chairing a session, please follow the guidelines below:

- Contact the speaker before your session starts.
- Check the equipment in the room. If something does not work or if anything else is needed, contact the PICMET volunteer responsible for your room.
- Introduce each speaker.
- Coordinate the time allocated to each speaker so that each has about equal time, allowing about five minutes for questions from the audience.
- Fill out the Session Summary Form and leave it on the table in the room. (The form will be given to the session chair by the PICMET volunteer at the beginning of the session.)

SPEAKER GUIDELINES

If you are presenting a paper, please follow the guidelines below:

- Introduce yourself to your session chair, and provide him/her with a brief background statement that he/she can use in introducing you to the audience.
- Divide the 90 minutes by the number of papers in your session so that every speaker in the session has approximately the same length of time.
- Allow about five minutes for questions from the audience after your presentation.

AUDIO/VISUAL EQUIPMENT

Each session is equipped with a computer, an LCD projector and screen. If you need information about anything else concerning the conference, volunteers in the registration area will try to help you.

WI-FI

Wi-Fi will be available in the Grand Ballroom Lobby for PICMET guests who have brought their laptops.

PICMET VOLUNTEERS

PICMET Volunteers wearing white polo shirts with the PICMET logo will assist the participants throughout the conference. If you need help in locating the room where your session will be held or if there are equipment problems, for example, you can contact the PICMET Volunteers. They will do their best to help you. If you need information about anything else concerning the conference, a volunteer in the registration area will try to help you.

THAILAND GUIDE

TRANSPORTATION INFORMATION

TRANSPORTATION FROM PHUKET AIRPORT TO HILTON PHUKET ARCADIA RESORT & SPA
(The distance between Phuket Airport and the Hilton hotel is about 30 miles.)

HOTEL LIMOUSINE
- price 1,400 baht/one-way trip
- drive time: about 45 min.
- contact Hilton hotel at +66-76-396-433

AIRPORT TAXI
- price 750 baht/one-way trip
- drive time: about 45 min.
- contact counters in the airport arrival hall, 1st floor
- Tel. +66-76-351-360 (PMK) or +66-76-351-347-9 (Phuket Limousine and Business Service Co-operative Ltd.)

AIRPORT MINIBUS OR VAN
- price 180 baht/one-way trip
- drive time: about 90 min.
- service between 07.00 a.m. to 11.00 p.m. (minimum 5 passengers/trip)
- contact counters in the arrival hall, 1st floor
- Tel. +66-76-351-360 (PMK) or +66-76-351-347-9 (Phuket Limousine and Business Service Co-operative Ltd.)

CAR RENTAL (E.G. AVIS, BUDGET, HERTZ, NATIONAL)
- the rate varies based on size and style of vehicles, ranging between 1,200-2,500 baht/day (insurance and taxes are not included).

FAST FACTS ABOUT THAILAND

from the Tourism Authority of Thailand
www.tourismthailand.org

AREA
Thailand has a rough geographical area of 514, 000 sq km (200,000 sq miles). This makes Thailand roughly equivalent in size to France or Texas.

BANKING
Thai bank hours are generally Monday - Friday, 9:30 am to 3:30 pm; certain banks have shorter Saturday hours, and currency exchange booths are open considerably longer hours in Bangkok and other tourist destinations.

CAPITAL
Bangkok

COUNTRY
Thailand, the only Southeast Asian nation never to have been colonized by European powers, is a constitutional monarchy whose current head of state is HM Bhumibol Adulyadej. A unified Thai kingdom has existed since the mid-14th century, and Thailand was known as Siam until 1939, when it officially became the Kingdom of Thailand.

CURRENCY
The currency of Thailand is the Thai Baht. Baht come in both coin and banknote form. The size of Thai currency, both coins and bills, increases with value and varies in color.

ECONOMICS
The economy of Thailand is reliant on exports, which account for 60 percent of Thailand's approximately US$ 200 billion GDP. The economy of Thailand is the second largest in Southeast Asia. Thailand's exports consist primarily of agricultural products including fish and rice, of which it is the largest exporter in the world, as well as textiles, rubber, automobiles, computers and other electronic appliances, and jewelry. While one of the premier tourist destinations in the world, Thailand relies on tourism to provide only 7 percent of its GDP.

ELECTRICITY
Electrical outlets in Thailand are charged to 220v at 50 cycles per second, which is compatible with appliances from the U.K. but not those from the US and many other nations. While most computer cables have adaptors for voltage, visitors from the U.S. and those not on the 220/50 v. will have to bring adapters to run most other appliances. Outlets in Thailand generally feature flat, two pronged plugs, though some feature holes for round plug ends. Few outlets feature three holes (grounded outlets), so it is often necessary to have a three to two prong adapter for using notebook computers in Thailand.

LANGUAGE
More than 92 percent of the population speaks Thai or one of its regional dialects. While the Thai language is the official language of Thailand, as a result of its cosmopolitan capital city and established tourism infrastruc-

THAILAND GUIDE

ture, English is spoken and understood throughout much of Thailand.

POPULATION
The population of Thailand comprises roughly 65 million citizens, the majority of whom are ethnically Thai, though peoples of Chinese, Indian, Malay, Mon, Khmer, Burmese, and Lao origin are also represented to varying degrees. Approximately 7 million citizens live in the capital city, Bangkok, though this number varies seasonally and is otherwise difficult to accurately count.

POST OFFICE
The Thailand postal service is efficient and reliable with branches in most major towns throughout the Kingdom. Thailand post offices are open M-F, 8am-4:30pm, and Saturday-Sunday, 9am-1pm. However, The Central GPO in Bangkok, located on New Road, is open until 6pm M-F and Saturday-Sunday 9am-1pm. All Thai post offices are closed on public holidays, though most major hotels can arrange to mail letters and parcels on your behalf. In addition to domestic and international mail services, both land and air, standard and registered, the Thailand postal service also provides telegram service.

TELEPHONE
The Thai phone system is both modern and widespread, with comprehensive coverage for cell phones and reliable pay phones found throughout the kingdom. Purchasing a second-hand Thai phone is inexpensive and convenient, and calling from Thailand on a public phone is easy with a phone card available at most convenience stores. Emergency numbers are often three or four digit numbers, including Tourist Police, which is 1155.

TEMPERATURE
Located just 15 degrees north of the equator, Thailand has a tropical climate, and temperatures typically range from 19 to 38 degrees C (66-100 F).

TIME
Thailand Standard time is GMT +7. Thailand does not observe daylight savings.

WEATHER
The weather in Thailand is generally hot and humid, typical of its location within the tropics. Generally speaking, Thailand can be divided into three seasons: "hot" season, rainy season, and "cool" season, though Thailand's geography allows visitors to find suitable weather somewhere in the country throughout the year.

WEIGHTS & MEASURES
Thailand uses the metric system for all weights and measurements, with the exception for area, which Thais divide into wa and rai.

PHUKET

from the Tourism Authority of Thailand
www.tourismthailand.org

Phuket, Thailand's largest island and premier beach destination, is located approximately 862 kilometers south of Bangkok and is often dubbed "the pearl of the Andaman", or "the pearl of the south". Its natural attractions include white powdery beaches, limestone cliffs, broad and tranquil bays, tropical in-land forests, and 32 smaller islands. The island is dominated by a chain of mountains running north-south along the west coast and includes numerous microclimates and a diversity of flora and fauna. Along the coast there are dozens of beaches, each with its own characteristics, ranging from lively Patong Beach to more secluded Mum Nai Bay.

In addition to the many activities and attractions on Phuket itself, there are numerous spectacular day-trip attractions surrounding the island. To the east of Phuket lies Phang Nga Bay, one of the top destinations for sea kayaking. The islands of Mu Koh Phi Phi National Park are a short boat trip to the southeast of Phuket. The Similan and Surin Islands, to the northwest of Phuket, feature some of the finest dive sites in Thailand.

Phuket is located close to the mainland, and there are bridges that allow overland travel to Phuket. Consequently, it is possible to travel there by land, sea, or air.

SOCIAL EVENTS

To facilitate the informal interaction of the participants, several social events have been scheduled during PICMET '10.

WELCOMING RECEPTION/BUFFET

DATE: SUNDAY, JULY 18
TIME: 19:00—22:00
LOCATION: LAGOON LAWN
DRESS: INFORMAL

Meet other conference attendees, renew old acquaintances and begin new friendships and collaborations at this opening reception/international buffet at the Hilton's Lagoon Lawn.

After dinner, guests will be entertained with a taste of Thai culture in a show titled "Traditional Way of Life." Included in the registration fee.*

MONDAY DINNER

DATE: MONDAY, JULY 19
TIME: 19:30—22:00
LOCATION: LAGOON LAWN
DRESS: INFORMAL

Enjoy a variety of traditional Thai dishes and the lush tropical gardens surrounding the Hilton's Lagoon Lawn while you mingle and network with colleagues. After dinner, guests will be entertained by the "Four Regional Dances and Ramayana Show." Included in the registration fee.*

AWARDS BANQUET

DATE: TUESDAY, JULY 20
CASH BAR: 19:00—19:30 (IN THE GRAND BALLROOM LOBBY)
BANQUET: 19:30—22:00
LOCATION: GRAND BALLROOM
DRESS: BUSINESS ATTIRE

This is the premier social event of the conference. The PICMET '10 "Leadership in Technology Management," "Medal of Excellence" and "Outstanding Student Paper" awards will be presented at the banquet. After dinner, "Thai Classical Dance" will be the featured entertainment. Included in the registration fee.*

The student and one-day registration fees do not cover evening events. Tickets for each of the Sunday – Tuesday events may be purchased on-line at www.picmet.org when registering for the conference or on-site at the registration desk.

TECHNICAL PROGRAM

PROGRAM OVERVIEW

The PICMET '10 technical program consists of 126 sessions including 5 plenaries, 2 tutorials, 2 special sessions and 117 paper sessions.

The plenaries are scheduled from 08:00 to 9:30 every morning, Monday, July 19 through Thursday, July 22; and also from 13:00-14:30 on Monday, July 19, in the Grand Ballroom. They are described in the "Plenaries" section of this Bulletin.

The Tutorials are offered by experts in specific areas of technology management. They are scheduled among the regular paper sessions.

THE PAPERS

Research papers and applications-oriented papers are explicitly identified in this conference. Separate evaluation criteria were used, and different referees were selected for each category to make sure that appropriate papers were included in the conference for the "Research" and "Application" categories. We emphasized research methodology, the use of the research literature, the theory behind the paper, the sample size, and the impact on the research community of the "Research Papers." The important evaluation criteria for "Industry Applications" were the usefulness of the application, the importance of the case being discussed, the generalizability of the concepts presented, and the impact of the paper on the users of technology management. The "Research Papers" included in PICMET '10 are listed with an [R] in front of their titles on the following pages; and the "Industry Applications" papers are shown with an [A] in front of their titles. Roughly 80 percent are in the [R] category, and the rest are in the [A] category.

The Research Papers and Industry Applications are mixed in the sessions. This was done intentionally to assure effective exchange of ideas among those presentir research papers and those presenting applications-orien ed papers.

THE SCHEDULE

The plenary is the only session in the 08:00-9:30 time slot. After that, there are up to 9 break-out sessions throughout the day, Monday through Thursday.

In order to make the sessions easy to see, we have prepared the schedule listings in two different formats for you.

First, you will find a pictorial display of the sessions for each day. The four pages (one for each day) should help you visualize what session is scheduled in what time slot and in which room each day.

In the second set of schedules, the sessions are listed in chronological in order to give you a breakdown of the sessions by time of day.

Finally, you will find a "Personal Schedule" following the schedule listings. It is a chart for you to make your own schedule. Only the common events are marked up on the personal schedule. You can fill it out as a daily calendar for the sessions you would like to follow, events to attend, and people to meet with.

We hope these will help you to take full advantage of the richness of the technical program at PICMET '10.

DAILY SCHEDULE

MONDAY, JULY 19, 2010

		01 Ballroom A	02 Ballroom B	03 Similan 1	04 Similan 2	05 Arcadia Hall 1	06 Arcadia Hall 2	07 Lagoon Hall 1	08 Lagoon Hall 2	09 Business Center
MA	7/19/2010 08:00-09:30	Plenary - 1								
MB	7/19/2010 10:00-11:30	Strategic Management of Technology - 1	Knowledge Management - 1	Technical Workforce - 1	Patent Analysis - 1	Innovation Management - 1	Technology Adoption and Diffusion - 1	Quality Management - 1	Environmental Issues - 1	Technology Management in Semiconductors Industry - 1
MC	7/19/2010 11:30-13:00									
MD	7/19/2010 13:00-14:30	Plenary - 2								
ME	7/19/2010 15:00-16:30	R&D Management - 1	Competitiveness - 1	Collaborations for Technology Management - 1	Technology Forecasting - 2	Innovation Management - 2	Technology Adoption and Diffusion - 2	Technology Management in Health Industry - 1	Technology Transfer - 1	
MF	7/19/2010 17:00-18:30	R&D Management - 2	Science and Technology Policy - 1	Collaborations for Technology Management - 3	Patent Analysis - 2	Innovation Management - 3	Technology Adoption and Diffusion - 3	Outsourcing - 1	E-Business - 1	
		01 Ballroom A	**02 Ballroom B**	**03 Similan 1**	**04 Similan 2**	**05 Arcadia Hall 1**	**06 Arcadia Hall 2**	**07 Lagoon Hall 1**	**08 Lagoon Hall 2**	**09 Business Center**

DAILY SCHEDULE

TUESDAY, JULY 20, 2010

		01 Ballroom A	02 Ballroom B	03 Similan 1	04 Similan 2	05 Arcadia Hall 1	06 Arcadia Hall 2	07 Lagoon Hall 1	08 Lagoon Hall 2	09 Business Center
TA	7/20/2010 08:00-09:30	Plenary - 3								
TB	7/20/2010 10:00-11:30	Disruptive Technologies - 1	Decision Making - 1	Project/Program Management - 1	Patent Analysis - 3	Commercialization of Technology - 1	Technology Management in Defense Industry - 1	Technology Management in Semiconductors Industry - 2	Supply Chain Management - 1	
TC	7/20/2010 11:30-13:00									
TD	7/20/2010 13:00-14:30	Technology Roadmapping - 1	Decision Making - 2	Social Network Analysis - 1	Intellectual Property - 1	New Venture Management - 1	Education - 1	Technology Management in Telecommunication Industry - 1	Technology Transfer - 2	
TE	7/20/2010 15:00-16:30	Technology Roadmapping - 2	Decision Making - 3	Social Network Analysis - 2	Patent Analysis - 4	Entrepreneurship/ Intrapreneurship - 1	Technology Management in Service Industry - 1	New Product Development - 1	Cultural Issues - 1	
TF	7/20/2010 17:00-18:30			TUTORIAL: Implementing Project Management Methodologies in Organizations: Global Success Stories	Technology Assessment and Evaluation - 1	Entrepreneurship/ Intrapreneurship - 2	Global Issues - 1		Cultural Issues - 2	
		01 Ballroom A	**02 Ballroom B**	**03 Similan 1**	**04 Similan 2**	**05 Arcadia Hall 1**	**06 Arcadia Hall 2**	**07 Lagoon Hall 1**	**08 Lagoon Hall 2**	**09 Business Center**

DAILY SCHEDULE

WEDNESDAY, JULY 21, 2010

		01 Ballroom A	02 Ballroom B	03 Similan 1	04 Similan 2	05 Arcadia Hall 1	06 Arcadia Hall 2	07 Lagoon Hall 1	08 Lagoon Hall 2	09 Business Center
WA	7/21/2010 08:00-09:30	Plenary - 4								
WB	7/21/2010 10:00-11:30	New Product Development - 2	Enterprise Management - 1	Technical Workforce - 2	Software Process Management - 1	Sustainability - 1	Technology Forecasting - 1	Information Technology - 1	Technology Management in Service Industry - 2	
WC	7/21/2010 11:30-13:00									
WD	7/21/2010 13:00-14:30	New Product Development - 3	Technology Management in Service Industry - 3	TUTORIAL: Real Project Costs: What You Should Know and Why No One Listens!	Software Process Management - 2	Technical Workforce - 3	Ph.D. Colloquium - 1			
WE	7/21/2010 15:00-16:30	Technology Forecasting - 1	Information Technology - 2	Project/Program Management - 2		Innovation Management - 4	Ph.D. Colloquium - 2			
WF	7/21/2010 17:00-18:30	Emerging Technologies - 1	Information Technology - 3	Project/Program Management - 3	Technology Management in Aerospace Industry - 1	Innovation Management - 5	Technology Management in Energy Industry - 1			
		01 Ballroom A	**02 Ballroom B**	**03 Similan 1**	**04 Similan 2**	**05 Arcadia Hall 1**	**06 Arcadia Hall 2**	**07 Lagoon Hall 1**	**08 Lagoon Hall 2**	**09 Business Center**

DAILY SCHEDULE

THURSDAY, JULY 22, 2010

		01 Ballroom A	02 Ballroom B	03 Similan 1	04 Similan 2	05 Arcadia Hall 1	06 Arcadia Hall 2	07 Lagoon Hall 1	08 Lagoon Hall 2	09 Business Center
HA	7/22/2010 08:00-09:30	Plenary - 5								
HB	7/22/2010 10:00-11:30	Emerging Technologies - 2	Information Management - 1	Collaborations for Technology Management - 2	Patent Analysis - 5	Innovation Management - 6	Technology Management in Automotive Industry - 1			
HC	7/22/2010 11:30-13:00									
HD	7/22/2010 13:00-14:30	Strategic Management of Technology - 2	Information Management - 2	Science and Technology Policy - 2	Intellectual Property - 2	Innovation Management - 7	Technology Management in Energy Industry - 2			
HE	7/22/2010 15:00-16:30	Strategic Management of Technology - 3	Knowledge Management - 2		Manufacturing Management - 1	Innovation Management - 8	Technology Management in Energy Industry - 3			
HF	7/22/2010 17:00-18:30		Knowledge Management - 3	PICMET 2011 Planning Session	Innovation Management - 9					
		01 Ballroom A	**02 Ballroom B**	**03 Similan 1**	**04 Similan 2**	**05 Arcadia Hall 1**	**06 Arcadia Hall 2**	**07 Lagoon Hall 1**	**08 Lagoon Hall 2**	**09 Business Center**

SCHEDULE OF SESSIONS

SCHEDULE OF SESSIONS BY DATE

MONDAY, JULY 19, 2010

Session	Number	Day	Time	Room	Session Title
MA	01	Monday	08:00 - 09:30	Ballroom A	PLENARY: “Plenary - 1”
MB	01	Monday	10:00 - 11:30	Ballroom A	“Strategic Management of Technology - 1”
MB	02	Monday	10:00 - 11:30	Ballroom B	“Knowledge Management - 1”
MB	03	Monday	10:00 - 11:30	Similan 1	“Technical Workforce - 1”
MB	04	Monday	10:00 - 11:30	Similan 2	“Patent Analysis - 1”
MB	05	Monday	10:00 - 11:30	Arcadia Hall 1	“Innovation Management - 1”
MB	06	Monday	10:00 - 11:30	Arcadia Hall 2	“Technology Adoption and Diffusion - 1”
MB	07	Monday	10:00 - 11:30	Lagoon Hall 1	“Quality Management - 1”
MB	08	Monday	10:00 - 11:30	Lagoon Hall 2	“Environmental Issues - 1”
MB	09	Monday	10:00 - 11:30	Business Center	“Technology Management in Semiconductors Industry - 1”
MD	01	Monday	13:00 - 14:30	Ballroom A	PLENARY: “Plenary - 2”
ME	01	Monday	15:00 - 16:30	Ballroom A	“R&D Management - 1”
ME	02	Monday	15:00 - 16:30	Ballroom B	“Competitiveness - 1”
ME	03	Monday	15:00 - 16:30	Similan 1	“Collaborations for Technology Management - 1”
ME	04	Monday	15:00 - 16:30	Similan 2	“Technology Forecasting - 2”
ME	05	Monday	15:00 - 16:30	Arcadia Hall 1	“Innovation Management - 2”
ME	06	Monday	15:00 - 16:30	Arcadia Hall 2	“Technology Adoption and Diffusion - 2”
ME	07	Monday	15:00 - 16:30	Lagoon Hall 1	“Technology Management in Health Industry - 1”
ME	08	Monday	15:00 - 16:30	Lagoon Hall 2	“Technology Transfer - 1”
MF	01	Monday	17:00 - 18:30	Ballroom A	“R&D Management - 2”
MF	02	Monday	17:00 - 18:30	Ballroom B	“Science and Technology Policy - 1”
MF	03	Monday	17:00 - 18:30	Similan 1	“Collaborations for Technology Management - 3”
MF	04	Monday	17:00 - 18:30	Similan 2	“Patent Analysis - 2”
MF	05	Monday	17:00 - 18:30	Arcadia Hall 1	“Innovation Management - 3”
MF	06	Monday	17:00 - 18:30	Arcadia Hall 2	“Technology Adoption and Diffusion - 3”
MF	07	Monday	17:00 - 18:30	Lagoon Hall 1	“Outsourcing - 1”
MF	08	Monday	17:00 - 18:30	Lagoon Hall 2	“E-Business - 1”

TUESDAY, JULY 20, 2010

TA	01	Tuesday	08:00 - 09:30	Ballroom A	PLENARY: “Plenary - 3”
TB	01	Tuesday	10:00 - 11:30	Ballroom A	“Disruptive Technologies - 1”
TB	02	Tuesday	10:00 - 11:30	Ballroom B	“Decision Making - 1”
TB	03	Tuesday	10:00 - 11:30	Similan 1	“Project/Program Management - 1”
TB	04	Tuesday	10:00 - 11:30	Similan 2	“Patent Analysis - 3”
TB	05	Tuesday	10:00 - 11:30	Arcadia Hall 1	“Commercialization of Technology - 1”

SCHEDULE OF SESSIONS

TB	06	Tuesday	10:00 - 11:30	Arcadia Hall 2	“Technology Management in Defense Industry - 1”
TB	07	Tuesday	10:00 - 11:30	Lagoon Hall 1	“Technology Management in Semiconductors Industry - 2”
TB	08	Tuesday	10:00 - 11:30	Lagoon Hall 2	“Supply Chain Management - 1”
TD	01	Tuesday	13:00 - 14:30	Ballroom A	“Technology Roadmapping - 1”
TD	02	Tuesday	13:00 - 14:30	Ballroom B	“Decision Making - 2”
TD	03	Tuesday	13:00 - 14:30	Similan 1	“Social Network Analysis - 1”
TD	04	Tuesday	13:00 - 14:30	Similan 2	“Intellectual Property - 1”
TD	05	Tuesday	13:00 - 14:30	Arcadia Hall 1	“New Venture Management - 1”
TD	06	Tuesday	13:00 - 14:30	Arcadia Hall 2	“Education - 1”
TD	07	Tuesday	13:00 - 14:30	Lagoon Hall 1	“Technology Management in Telecommunication Industry - 1”
TD	08	Tuesday	13:00 - 14:30	Lagoon Hall 2	“Technology Transfer - 2”
TE	01	Tuesday	15:00 - 16:30	Ballroom A	“Technology Roadmapping - 2”
TE	02	Tuesday	15:00 - 16:30	Ballroom B	“Decision Making - 3”
TE	03	Tuesday	15:00 - 16:30	Similan 1	“Social Network Analysis - 2”
TE	04	Tuesday	15:00 - 16:30	Similan 2	“Patent Analysis - 4”
TE	05	Tuesday	15:00 - 16:30	Arcadia Hall 1	“Entrepreneurship/ Intrapreneurship - 1”
TE	06	Tuesday	15:00 - 16:30	Arcadia Hall 2	“Technology Management in Service Industry - 1”
TE	07	Tuesday	15:00 - 16:30	Lagoon Hall 1	“New Product Development - 1”
TE	08	Tuesday	15:00 - 16:30	Lagoon Hall 2	“Cultural Issues - 1”
TF	03	Tuesday	17:00 - 18:30	Similan 1	TUTORIAL: “Implementing Project Management Methodologies in Organizations: Global Success Stories”
TF	04	Tuesday	17:00 - 18:30	Similan 2	“Technology Assessment and Evaluation - 1”
TF	05	Tuesday	17:00 - 18:30	Arcadia Hall 1	“Entrepreneurship/ Intrapreneurship - 2”
TF	06	Tuesday	17:00 - 18:30	Arcadia Hall 2	“Global Issues - 1”
TF	08	Tuesday	17:00 - 18:30	Lagoon Hall 2	“Cultural Issues - 2”

WEDNESDAY, JULY 21, 2010

WA	01	Wednesday	08:00 - 09:30	Ballroom A	PLENARY: “Plenary - 4”
WB	01	Wednesday	10:00 - 11:30	Ballroom A	“New Product Development - 2”
WB	02	Wednesday	10:00 - 11:30	Ballroom B	“Enterprise Management - 1”
WB	03	Wednesday	10:00 - 11:30	Similan 1	“Technical Workforce - 2”
WB	04	Wednesday	10:00 - 11:30	Similan 2	“Software Process Management - 1”
WB	05	Wednesday	10:00 - 11:30	Arcadia Hall 1	“Sustainability - 1”
WB	06	Wednesday	10:00 - 11:30	Arcadia Hall 2	“Technology Forecasting - 1”
WB	07	Wednesday	10:00 - 11:30	Lagoon Hall 1	“Information Technology - 1”
WB	08	Wednesday	10:00 - 11:30	Lagoon Hall 2	“Technology Management in Service Industry - 2”
WD	01	Wednesday	13:00 - 14:30	Ballroom A	“New Product Development - 3”
WD	02	Wednesday	13:00 - 14:30	Ballroom B	“Technology Management in Service Industry - 3”
WD	03	Wednesday	13:00 - 14:30	Similan 1	TUTORIAL: “Real Project Costs: What You Should Know and Why No One Listens! “

SCHEDULE OF SESSIONS

WD	04	Wednesday	13:00 - 14:30	Similan 2	"Software Process Management - 2"
WD	05	Wednesday	13:00 - 14:30	Arcadia Hall 1	"Technical Workforce - 3"
WD	06	Wednesday	13:00 - 14:30	Arcadia Hall 2	"Ph.D. Colloquium - 1"
WE	01	Wednesday	15:00 - 16:30	Ballroom A	"Technology Forecasting - 1"
WE	02	Wednesday	15:00 - 16:30	Ballroom B	"Information Technology - 2"
WE	03	Wednesday	15:00 - 16:30	Similan 1	"Project/Program Management - 2"
WE	05	Wednesday	15:00 - 16:30	Arcadia Hall 1	"Innovation Management - 4"
WE	06	Wednesday	15:00 - 16:30	Arcadia Hall 2	"Ph.D. Colloquium - 2"
WF	01	Wednesday	17:00 - 18:30	Ballroom A	"Emerging Technologies - 1"
WF	02	Wednesday	17:00 - 18:30	Ballroom B	"Information Technology - 3"
WF	03	Wednesday	17:00 - 18:30	Similan 1	"Project/Program Management - 3"
WF	04	Wednesday	17:00 - 18:30	Similan 2	"Technology Management in Aerospace Industry - 1"
WF	05	Wednesday	17:00 - 18:30	Arcadia Hall 1	"Innovation Management - 5"
WF	06	Wednesday	17:00 - 18:30	Arcadia Hall 2	"Technology Management in Energy Industry - 1"

THURSDAY, JULY 19, 2010

HA	01	Thursday	08:00 - 09:30	Ballroom A	PLENARY: "Plenary - 5"
HB	01	Thursday	10:00 - 11:30	Ballroom A	"Emerging Technologies - 2"
HB	02	Thursday	10:00 - 11:30	Ballroom B	"Information Management - 1"
HB	03	Thursday	10:00 - 11:30	Similan 1	"Collaborations for Technology Management - 2"
HB	04	Thursday	10:00 - 11:30	Similan 2	"Patent Analysis - 5"
HB	05	Thursday	10:00 - 11:30	Arcadia Hall 1	"Innovation Management - 6"
HB	06	Thursday	10:00 - 11:30	Arcadia Hall 2	"Technology Management in Automotive Industry - 1"
HD	01	Thursday	13:00 - 14:30	Ballroom A	"Strategic Management of Technology - 2"
HD	02	Thursday	13:00 - 14:30	Ballroom B	"Information Management - 2"
HD	03	Thursday	13:00 - 14:30	Similan 1	"Science and Technology Policy - 2"
HD	04	Thursday	13:00 - 14:30	Similan 2	"Intellectual Property - 2"
HD	05	Thursday	13:00 - 14:30	Arcadia Hall 1	"Innovation Management - 7"
HD	06	Thursday	13:00 - 14:30	Arcadia Hall 2	"Technology Management in Energy Industry - 2"
HE	01	Thursday	15:00 - 16:30	Ballroom A	"Strategic Management of Technology - 3"
HE	02	Thursday	15:00 - 16:30	Ballroom B	"Knowledge Management - 2"
HE	04	Thursday	15:00 - 16:30	Similan 2	"Manufacturing Management - 1"
HE	05	Thursday	15:00 - 16:30	Arcadia Hall 1	"Innovation Management - 8"
HE	06	Thursday	15:00 - 16:30	Arcadia Hall 2	"Technology Management in Energy Industry - 3"
HF	02	Thursday	17:00 - 18:30	Ballroom B	"Knowledge Management - 3"
HF	03	Thursday	17:00 - 18:30	Similan 1	"PICMET 2011 Planning Session"
HF	04	Thursday	17:00 - 18:30	Similan 2	"Innovation Management - 9"

SCHEDULE OF SESSIONS

SCHEDULE OF SESSIONS BY ROOM

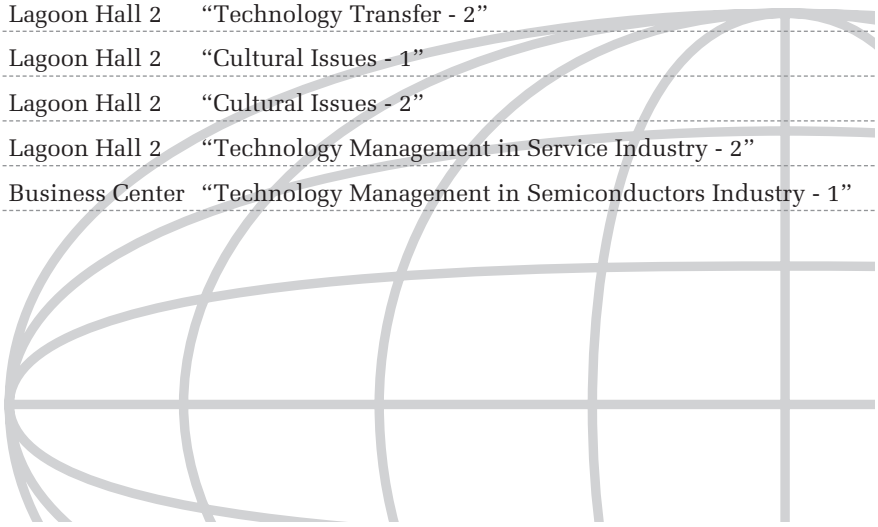
Session	Number	Day	Time	Room	Session Title
MA	01	Monday	08:00 - 09:30	Ballroom A	PLENARY: “Plenary - 1”
MB	01	Monday	10:00 - 11:30	Ballroom A	“Strategic Management of Technology - 1”
MD	01	Monday	13:00 - 14:30	Ballroom A	PLENARY: “Plenary - 2”
ME	01	Monday	15:00 - 16:30	Ballroom A	“R&D Management - 1”
MF	01	Monday	17:00 - 18:30	Ballroom A	“R&D Management - 2”
TA	01	Tuesday	08:00 - 09:30	Ballroom A	PLENARY: “Plenary - 3”
TB	01	Tuesday	10:00 - 11:30	Ballroom A	“Disruptive Technologies - 1”
TD	01	Tuesday	13:00 - 14:30	Ballroom A	“Technology Roadmapping - 1”
TE	01	Tuesday	15:00 - 16:30	Ballroom A	“Technology Roadmapping - 2”
WA	01	Wednesday	08:00 - 09:30	Ballroom A	PLENARY: “Plenary - 4”
WB	01	Wednesday	10:00 - 11:30	Ballroom A	“New Product Development - 2”
WD	01	Wednesday	13:00 - 14:30	Ballroom A	“New Product Development - 3”
WE	01	Wednesday	15:00 - 16:30	Ballroom A	“Technology Forecasting - 1”
WF	01	Wednesday	17:00 - 18:30	Ballroom A	“Emerging Technologies - 1”
HA	01	Thursday	08:00 - 09:30	Ballroom A	PLENARY: “Plenary - 5”
HB	01	Thursday	10:00 - 11:30	Ballroom A	“Emerging Technologies - 2”
HD	01	Thursday	13:00 - 14:30	Ballroom A	“Strategic Management of Technology - 2”
HE	01	Thursday	15:00 - 16:30	Ballroom A	“Strategic Management of Technology - 3”
MB	02	Monday	10:00 - 11:30	Ballroom B	“Knowledge Management - 1”
ME	02	Monday	15:00 - 16:30	Ballroom B	“Competitiveness - 1”
MF	02	Monday	17:00 - 18:30	Ballroom B	“Science and Technology Policy - 1”
TB	02	Tuesday	10:00 - 11:30	Ballroom B	“Decision Making - 1”
TD	02	Tuesday	13:00 - 14:30	Ballroom B	“Decision Making - 2”
TE	02	Tuesday	15:00 - 16:30	Ballroom B	“Decision Making - 3”
WB	02	Wednesday	10:00 - 11:30	Ballroom B	“Enterprise Management - 1”
WD	02	Wednesday	13:00 - 14:30	Ballroom B	“Technology Management in Service Industry - 3”
WE	02	Wednesday	15:00 - 16:30	Ballroom B	“Information Technology - 2”
WF	02	Wednesday	17:00 - 18:30	Ballroom B	“Information Technology - 3”
HB	02	Thursday	10:00 - 11:30	Ballroom B	“Information Management - 1”
HD	02	Thursday	13:00 - 14:30	Ballroom B	“Information Management - 2”
HE	02	Thursday	15:00 - 16:30	Ballroom B	“Knowledge Management - 2”
HF	02	Thursday	17:00 - 18:30	Ballroom B	“Knowledge Management - 3”
MB	03	Monday	10:00 - 11:30	Similan 1	“Technical Workforce - 1”
ME	03	Monday	15:00 - 16:30	Similan 1	“Collaborations for Technology Management - 1”
MF	03	Monday	17:00 - 18:30	Similan 1	“Collaborations for Technology Management - 3”

Schedule of Sessions

TB	03	Tuesday	10:00 - 11:30	Similan 1	“Project/Program Management - 1”
TD	03	Tuesday	13:00 - 14:30	Similan 1	“Social Network Analysis - 1”
TE	03	Tuesday	15:00 - 16:30	Similan 1	“Social Network Analysis - 2”
TF	03	Tuesday	17:00 - 18:30	Similan 1	TUTORIAL: “Implementing Project Management Methodologies in Organizations: Global Success Stories”
WB	03	Wednesday	10:00 - 11:30	Similan 1	“Technical Workforce - 2”
WD	03	Wednesday	13:00 - 14:30	Similan 1	TUTORIAL: “Real Project Costs: What You Should Know and Why No One Listens! “
WE	03	Wednesday	15:00 - 16:30	Similan 1	“Project/Program Management - 2”
WF	03	Wednesday	17:00 - 18:30	Similan 1	“Project/Program Management - 3”
HB	03	Thursday	10:00 - 11:30	Similan 1	“Collaborations for Technology Management - 2”
HD	03	Thursday	13:00 - 14:30	Similan 1	“Science and Technology Policy - 2”
HF	03	Thursday	17:00 - 18:30	Similan 1	“PICMET 2011 Planning Session”
MB	04	Monday	10:00 - 11:30	Similan 2	“Patent Analysis - 1”
ME	04	Monday	15:00 - 16:30	Similan 2	“Technology Forecasting - 2”
MF	04	Monday	17:00 - 18:30	Similan 2	“Patent Analysis - 2”
TB	04	Tuesday	10:00 - 11:30	Similan 2	“Patent Analysis - 3”
TD	04	Tuesday	13:00 - 14:30	Similan 2	“Intellectual Property - 1”
TE	04	Tuesday	15:00 - 16:30	Similan 2	“Patent Analysis - 4”
TF	04	Tuesday	17:00 - 18:30	Similan 2	“Technology Assessment and Evaluation - 1”
WB	04	Wednesday	10:00 - 11:30	Similan 2	“Software Process Management - 1”
WD	04	Wednesday	13:00 - 14:30	Similan 2	“Software Process Management - 2”
WF	04	Wednesday	17:00 - 18:30	Similan 2	“Technology Management in Aerospace Industry - 1”
HB	04	Thursday	10:00 - 11:30	Similan 2	“Patent Analysis - 5”
HD	04	Thursday	13:00 - 14:30	Similan 2	“Intellectual Property - 2”
HE	04	Thursday	15:00 - 16:30	Similan 2	“Manufacturing Management - 1”
HF	04	Thursday	17:00 - 18:30	Similan 2	“Innovation Management - 9”
MB	05	Monday	10:00 - 11:30	Arcadia Hall 1	“Innovation Management - 1”
ME	05	Monday	15:00 - 16:30	Arcadia Hall 1	“Innovation Management - 2”
MF	05	Monday	17:00 - 18:30	Arcadia Hall 1	“Innovation Management - 3”
TB	05	Tuesday	10:00 - 11:30	Arcadia Hall 1	“Commercialization of Technology - 1”
TD	05	Tuesday	13:00 - 14:30	Arcadia Hall 1	“New Venture Management - 1”
TE	05	Tuesday	15:00 - 16:30	Arcadia Hall 1	“Entrepreneurship/ Intrapreneurship - 1”
TF	05	Tuesday	17:00 - 18:30	Arcadia Hall 1	“Entrepreneurship/ Intrapreneurship - 2”
WB	05	Wednesday	10:00 - 11:30	Arcadia Hall 1	“Sustainability - 1”
WD	05	Wednesday	13:00 - 14:30	Arcadia Hall 1	“Technical Workforce - 3”
WE	05	Wednesday	15:00 - 16:30	Arcadia Hall 1	“Innovation Management - 4”
WF	05	Wednesday	17:00 - 18:30	Arcadia Hall 1	“Innovation Management - 5”
HB	05	Thursday	10:00 - 11:30	Arcadia Hall 1	“Innovation Management - 6”

Schedule of Sessions

HD	05	Thursday	13:00 - 14:30	Arcadia Hall 1	“Innovation Management - 7”
HE	05	Thursday	15:00 - 16:30	Arcadia Hall 1	“Innovation Management - 8”
MB	06	Monday	10:00 - 11:30	Arcadia Hall 2	“Technology Adoption and Diffusion - 1”
ME	06	Monday	15:00 - 16:30	Arcadia Hall 2	“Technology Adoption and Diffusion - 2”
MF	06	Monday	17:00 - 18:30	Arcadia Hall 2	“Technology Adoption and Diffusion - 3”
TB	06	Tuesday	10:00 - 11:30	Arcadia Hall 2	“Technology Management in Defense Industry - 1”
TD	06	Tuesday	13:00 - 14:30	Arcadia Hall 2	“Education - 1”
TE	06	Tuesday	15:00 - 16:30	Arcadia Hall 2	“Technology Management in Service Industry - 1”
TF	06	Tuesday	17:00 - 18:30	Arcadia Hall 2	“Global Issues - 1”
WB	06	Wednesday	10:00 - 11:30	Arcadia Hall 2	“Technology Forecasting - 1”
WD	06	Wednesday	13:00 - 14:30	Arcadia Hall 2	“Ph.D. Colloquium - 1”
WE	06	Wednesday	15:00 - 16:30	Arcadia Hall 2	“Ph.D. Colloquium - 2”
WF	06	Wednesday	17:00 - 18:30	Arcadia Hall 2	“Technology Management in Energy Industry - 1”
HB	06	Thursday	10:00 - 11:30	Arcadia Hall 2	“Technology Management in Automotive Industry - 1”
HD	06	Thursday	13:00 - 14:30	Arcadia Hall 2	“Technology Management in Energy Industry - 2”
HE	06	Thursday	15:00 - 16:30	Arcadia Hall 2	“Technology Management in Energy Industry - 3”
MB	07	Monday	10:00 - 11:30	Lagoon Hall 1	“Quality Management - 1”
ME	07	Monday	15:00 - 16:30	Lagoon Hall 1	“Technology Management in Health Industry - 1”
MF	07	Monday	17:00 - 18:30	Lagoon Hall 1	“Outsourcing - 1”
TB	07	Tuesday	10:00 - 11:30	Lagoon Hall 1	“Technology Management in Semiconductors Industry - 2”
TD	07	Tuesday	13:00 - 14:30	Lagoon Hall 1	“Technology Management in Telecommunication Industry - 1”
TE	07	Tuesday	15:00 - 16:30	Lagoon Hall 1	“New Product Development - 1”
WB	07	Wednesday	10:00 - 11:30	Lagoon Hall 1	“Information Technology - 1”
MB	08	Monday	10:00 - 11:30	Lagoon Hall 2	“Environmental Issues - 1”
ME	08	Monday	15:00 - 16:30	Lagoon Hall 2	“Technology Transfer - 1”
MF	08	Monday	17:00 - 18:30	Lagoon Hall 2	“E-Business - 1”
TB	08	Tuesday	10:00 - 11:30	Lagoon Hall 2	“Supply Chain Management - 1”
TD	08	Tuesday	13:00 - 14:30	Lagoon Hall 2	“Technology Transfer - 2”
TE	08	Tuesday	15:00 - 16:30	Lagoon Hall 2	“Cultural Issues - 1”
TF	08	Tuesday	17:00 - 18:30	Lagoon Hall 2	“Cultural Issues - 2”
WB	08	Wednesday	10:00 - 11:30	Lagoon Hall 2	“Technology Management in Service Industry - 2”
MB	09	Monday	10:00 - 11:30	Business Center	“Technology Management in Semiconductors Industry - 1”



PERSONAL SCHEDULE

	Sunday July 18, 2010	Monday July 19, 2010	Tuesday July 20, 2010	Wednesday July 21, 2010	Thursday July 22, 2010
07:30 – 08:00 Breakfast					
08:00 – 09:30 (A)		Morning Plenary (Grand Ballroom)	Morning Plenary (Grand Ballroom)	Morning Plenary (Grand Ballroom)	Morning Plenary (Grand Ballroom)
09:30 – 10:00 Coffee Break					
10:00 – 11:30 (B)					
11:30 – 13:00 Lunch Break					
13:00 – 14:30 (D)		Afternoon Plenary (Grand Ballroom)			
14:30 – 15:00 Coffee Break					
15:00 – 16:30 (E)					
16:30 – 17:00 Coffee Break					
17:00 – 18:30 (F)					PICMET '11 and PICMET '12 Planning Session (Similan 1)
19:30 – 22:00	Welcome Reception (Lagoon Lawn)	Monday Dinner (Lagoon Lawn)	Awards Banquet (Grand Ballroom)		

PLENARIES

PLENARY SESSION—1

DATE: MONDAY, JULY 19, 2010
TIME: 08:00-9:30
ROOM: GRAND BALLROOM

Session Chair: Dr. Pansak Sirirachatapong, Executive Director, National Electronics and Computer Technology Center (NECTEC), Thailand

KEYNOTE

Dr. Pichet Durongkaveroj, Secretary General,National Science Technology and Innovation Policy Office, Thailand

"Science Technology and Innovation: Policy and Management Perspectives"

Science, technology and innovation (STI) increasingly plays a dominant role not only in the advancement of the science and the technology itself, but also in its contribution to citizen empowerment, productivity improvement, corporate innovativeness and quality of life enhancement. The design of STI policy is relatively complex yet requires focus: it must move toward competitiveness and excellence yet it must be integrative, transparent and participative; it must think globally yet act mainly domestically and locally. Society also looks to STI policy and management not only for trade and economic purposes, but also for social objectives such as poverty reduction and social equity. To manage STI policy effectively requires political will, leadership, social awareness, understanding, and in many cases social acceptance. Thailand's 10-year STI Plan will take these challenges to the level where changes can be implemented and sustainable development, possibly through the sufficiency economy philosophy, can be achieved.

Dr. Pichet Durongkaveroj is the Secretary General of the National Science Technology and Innovation Policy Office, Thailand. His previous positions include Executive Director, Knowledge Network Institute of Thailand; Director, Policy Innovation Center, King Mongkut's University of Technology Thonburi; Chairman, e-ASEAN Working Group; Director, National Information Technology Committee (NITC) Secretariat; Director, Electronic Commerce Resource Center, NECTEC; and Researcher, Thailand Development Research Institute.

Dr. Pichet is a member of the following organizations: Information Technology Projects under the Initiative of H.R.H. Princess Maha Chakri Sirindhorn; the National Science and Technology Development Board; the Internet for Schools and Communities Foundation; the Sub-committee on Planning and Policy, Commission on Higher Education; the Executive Board, Thailand Environment Institute; the Sub-committee on Organization Performance Indicators, Office of the Public Sector Development Commission; and the Thai Delegation, ASEAN Committee on Science and Technology.

Dr. Pichet received the Ph.D. in Public Policy and Management from the Wharton School, University of Pennsylvania, USA. He received the M.Eng.Sc. in Applied Solar Energy from Trinity University, USA; and the B.E. in Electrical Engineering from the University of New South Wales, Australia.

PLENARY SESSION—2

DATE: MONDAY, JULY 19, 2010
TIME: 13:00-14:30
ROOM: GRAND BALLROOM

Session Chair: Dr. Kwan Sitathani, Deputy Executive Director, National Electronics and Computer Technology Center (NECTEC), Thailand

KEYNOTE-1

Kan Trakulhoon, President and CEO, Siam Cement Group (SCG), Thailand

"Managing Technology and Innovation of SCG: A Case Study"

SCG thrives to becoming an "Innovative Organization," generating pioneering, environmentally friendly products referred to as "High Value Added Products," incrementing value for our customers and stakeholders, maintaining regional market leadership, and sustaining a strong presence in all communities where SCG operates. To ensure value creation, SCG warrants over 1 billion Baht annually on R&D budget to support R&D activities which include conducting campaigns such as SCG's Power of Innovation Awards to advocate creativity and innovation

among staff, applying intellectual property management on novel findings and solutions, and collaborating with government entities to promote Thailand as a regional trading hub. These formations help secure SCG as one of ASEAN's market leader.

Kan Trakulhoon is President and CEO of Siam Cement Group (SCG). He began his career with SCG as an engineer in 1977 and has held various management positions in the company's key strategic business units including petrochemicals, cement, and ceramics until becoming President and CEO in 2006.

Aside from his role at Siam Cement Group, Mr. Kan is concurrently an outside Director to Kubota Corporation. He also served as members in a number of professional organizations such as Member of the World Business Council for Sustainable Development (WBCSD), Member of the Board of Trustees and Council Member of Asia Business Council, Board Member of the School of Engineering and Technology, Asian Institute of Technology (AIT), Advisory Council Member of Sasin Graduate Institute of Business Administration, Chulalongkorn University, and Member of East Asia Council, INSEAD.

Mr. Kan graduated with a Bachelor's degree in Electrical Engineering (First Class Honors) from Chulalongkorn University in 1977 and two Master's Degrees, M.S. Engineering and M.S. Management, from the Georgia Institute of Technology in 1986.

KEYNOTE-2

Dr. Jay Lee, Ohio Eminent Scholar and L.W. Scott Alter Chair Professor, University of Cincinnati; Founding Director, National Science Foundation (NSF) Industry/ University Cooperative Research Center on Intelligent Maintenance Systems

"Innovating the Invisible: Dominant Innovation for Product and Service Systems in a Changing World"

Innovation is not an option for today's industry. For the past decade, globalization and transformation of the flat-world economy have produced vast new challenges for industry. Innovation is not just about new product development; it also refers to the creation of new value-added services to transform better productivity and business performance. As the practice of product design has expanded, both in economic and social impact and in technological complexity, so have the demands upon innovative service systems.

This presentation introduces a dominant innovation system and tools for products and services in a changing competitive global market. Examples will be given to illustrate how to formulate "gaps" between a product and customer's invisible needs using an innovation matrix and application space mapping tools. In addition, examples will be used to illustrate how world-class companies and small- to medium-size companies can transform themselves to become innovative leaders.

Dr. Jay Lee is Ohio Eminent Scholar and L.W. Scott Alter Chair Professor at the University of Cincinnati and is founding director of the National Science Foundation (NSF) Industry/University Cooperative Research Center (I/UCRC) on Intelligent Maintenance Systems (IMS www.imscenter.net), which is a multi-campus NSF Center of Excellence between the University of Cincinnati (lead institution), the University of Michigan, and Missouri University of S&T in partnerships with over 40 global companies including P&G, Toyota, GE Aviation, Boeing, AMD, Caterpillar, Siemens, DaimlerChrysler, ETAS, Festo, Harley-Davidson, Honeywell, ITRI (Taiwan), Omron (Japan), Bosch, Parker Hannifin, BorgWarner, Spirit AeroSystems, Nissan (Japan), Syncrude (Canada), CISCO, Alstom (France), Delta Electronics (Taiwan), and the Army Research Lab.

He is Changjiang Chair Professor as well as Dean of the newly established Advanced Industrial Technology Research Institute (AITRI) at Shanghai Jiao Tong University. In addition, he is an honorary professor of City University of Hong Kong and serves as a visiting professor for a number of institutions including Cranfield University in the UK, Lulea University of Technology in Sweden, University of Manchester, Hong Kong Polytechnic University, Xian Jiao Tong University, and Harbin Institute of Technology (HIT) in China. His current research focuses on dominant innovation design tools and smart infotronics technologies for service and maintenance automation applications.

Previously, he was Director for Product Development and Manufacturing at United Technologies Research Center (UTRC), East Hartford, Connecticut, and served as program directors for a number of programs at NSF during 1991-1998, including the Engineering Research Centers

PLENARIES

(ERCs) Program, the Industry/University Cooperative Research Centers (I/UCRCs) Program, and the Division of Design, Manufacture, and Industrial Innovation. In addition, he served on the board of Manufacturing and Engineering Design (BMAED) of the National Research Council during 2000-2005, Board of Directors for the National Center for Manufacturing Science (NCMS) during 1999-2001, as well as advisory member for a number of academic institutions including Johns Hopkins University and Cambridge University. He conducted research work at the Mechanical Engineering Lab of the Ministry of International Trades and Industry (MITI) as a Japan Science and Technology Agency (STA) Fellow in 1995, a Japan Society for Promotion of Science (JSPS) Fellow at the University of Tokyo in 1997, and a visiting professor at the Swiss Institute of Technology (EFFL) in Lausanne, Switzerland, in July 2004. He also served as an adjunct professor for a number of academic institutions including Johns Hopkins University.

Currently, he serves as advisor to a number of global organizations, including IBM MAXIMO Executive Advisory Council, Industrial Technology Research Institute (ITRI) in Taiwan, Japan Productivity Center (JPC), and the Academy of Machinery Science and Technology in China. In addition, he serves as editor and associate editor for a number of journals including IEEE Transaction on Industrial Informatics, International Journal on Prognostics and Health Management (IJPHM), International Journal of Asset Engineering and Management, International Journal on Service Operations and Informatics, and Tsinghua Science and Technology Journal. He has authored/co-authored over 150 technical publications, edited two books, contributed numerous book chapters, owns a number of patents, two trademarks, and he has delivered numerous invited lectures and speeches, including over 130 invited keynote and plenary speeches at major international conferences.

Dr. Lee received 2008 CIE-USA Distinguished Achievement Award, Professor of the Year Award and Distinguished Engineering Research Award from the University of Cincinnati in 2007, Milwaukee Mayor Technology Award in 2003, Milwaukee Idea Award in 2002, and was also a recipient of the SME Outstanding Young Manufacturing Engineering Award in 1992. He is a Fellow of ASME, SME, as well as a founding fellow of the International Society of Engineering Asset Management (ISEAM).

PLENARY SESSION—3

DATE: TUESDAY, JULY 20, 2010
TIME: 08:00-9:30
ROOM: GRAND BALLROOM

Session Chair: Dr. Kiyoshi Niwa, Professor Emeritus, The University of Tokyo

KEYNOTE-1

Dr. Manoo Ordeedolchest, Chairman, ICT Policy, Sripatum University, Thailand

"Strategies to Questing for Top Researchers/Scientists in the Next Decade"

Looking at the ways social behavior changes in response to the change of technologies, one has to agree that in the near future, our young talent will definitely choose how they work, where to work, when to work and for whom they work, as long as they produce the expected results. This makes it difficult for organizations to manage their workforces, particularly the scarce knowledge workers including researchers and scientists. Unless organizations learn to work with external specialists, they will face the problem of not being able to hire enough qualified in-house talent. We will be forced to do collaborative research with researchers around the globe. Commercialization and utilization of intellectual properties will be even more difficult due to the lack of qualified personnel; marketing IP will require a significantly more complex set of interdisciplinary skills. We will need a more service logic approach to market IP, meaning we must treat our clients as co-creators and work with them and engage with them to reach the final solution: working with them as trustworthy partners.

Dr. Manoo Ordeedolchest is Chairman of ICT Policy at Sripatum University, Thailand. He has actively served the computing industry for more than 40 years in many capacities. He was the President of the Association of Thai Computer Industry (ATCI) for 8 years; he now serves ATCI as Honorary President. In 2003 he was appointed by the Ministry of Information and Communication Technology to lead a new business promotion unit called Software Industry Promotion Agency, under the Ministry of ICT, where

he served as President for three years until his retirement in 2006. Prior to the appointment at the Ministry of ICT, he was Dean of the School of Technology at Shinnawatra University, Thailand.

From 2003-2004, Dr. Manoo was appointed President of the Asian-Oceania Computing Industry Organization (ASOCIO), the organization that represents computing and ICT-related associations of 19 countries in the Asian-Oceania region. He was the co-founder of Datamat Public Company Limited, a Thai systems integrator established in 1969, where he served as President until 1994.

For the past 40 years, Dr. Manoo has been regular part-time lecturer at many graduate schools in Thailand, such as Chulalongkorn University and the National Institute for Development Administration (NIDA).

Dr. Manoo received his Bachelor of Science in Electronics and Master of Science in Computer Science from Oregon State University, USA. He also received an Honorary Doctorate Degree from the National Institute for Development Administration (NIDA).

Dr. Manoo has served as an advisor and director in a number of prestigious organizations, including Chairman of Software Park Thailand under the Ministry of Science and Technology; committee member of the National Science and Technology Development Agency (NSTDA) under the Ministry of Science and Technology; committee member of the National Electronics and Computer Technology Center (NECTEC) under the Ministry of Science and Technology; Formal Committee of The National Education Council, Ministry of Education; Formal President of the Software Industry Promotion Agency (SIPA) under the Ministry of ICT; and Chairman of the ICT Commission: International Chamber of Commerce.

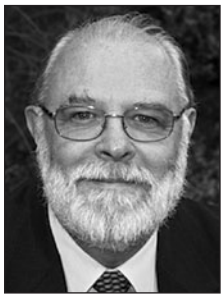
Dr. Manoo received the title of Fifth Class Knight Commander of the Most Admirable Order of the Direkgunabhorn.

KEYNOTE-2

Mr. Terry Oliver, Chief Technology Innovation Officer, Bonneville Power Administration, USA

"Picking Up the Pace: Utilities and Innovation in a Carbon Constrained World"

Non-carbon generation requires a re-think for electric utilities. Variable generation resources such as solar and wind push utility operations beyond normal comfort zones and place greater emphasis on energy storage and smart grid, and consequently on research and development. Bonneville Power Administration, an electric system in the Northwest corner of the United States is a leader in R&D, smart grid, and wind generation integration. Bonneville's breakthrough work to integrate large wind generation into the 500kV grid, advance smart grid and synchrophasors, and to imagine the next generation electric grid will be highlighted.



Bonneville operates 24,523 km of high voltage transmission, serves 145 retail utility systems, and markets about 80 GWh each year. The Federal Columbia River Power System, Bonneville's power supply source, has a peak capacity of 13 GW.

Terry Oliver has worked globally to advance energy conservation and renewable energy and now, electric utility industry research and development. He has worked for BPA since 1981.

In the Pacific Northwest (PNW) he:
- *Managed one of the world's largest residential energy conservation programs, the PNW Residential Weatherization Program,*
- *Led ground-breaking research on community-based energy conservation applications in the Hood River Conservation Project, and*
- *Established two enduring icons of energy efficiency innovation, the Lighting Design Lab and the Energy Ideas Clearinghouse.*

In 1992 he moved to Bangkok, Thailand, on what turned out to be an "extended sabbatical" of eight and a half years. In Thailand, he led the Asia Regional Office of the International Institute for Energy Conservation (IIEC). During his tenure with IIEC he:
- *Convinced the Asian Development Bank to support electric utility investments in DSM resources, and to walk-the-talk themselves by investing $3 million in a retrofit of their brand new Manila office, an investment which paid more than a 20 percent return to the bank,*
- *Empowered non-government organizations in Thailand, Philippines, and Indonesia to support environmentally and economically preferred conservation and renewable resources,*
- *Designed the first DSM programs ever undertaken by a developing country (Thailand), and*
- *Created linkages between sustainable energy, jobs, and the local and global environment throughout Asia, South*

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Africa, and the Middle East.

In 2000, Mr. Oliver returned to BPA where he worked on BPA's EnergyWeb concept and its application to the PNW. As part of this effort he helped create BPA's Non-Wires Solutions initiative, participated in EPRI's Intelligrid grid architecture initiative, and lead the GridWise Alliance Demonstrations Working Group.

In June 2005 Mr. Oliver was appointed Bonneville Power Administration's first Chief Technology Innovation Officer, responsible for re-energizing, focusing, and managing BPA's research and development activities.

PLENARY SESSION—4

DATE: WEDNESDAY, JULY 21, 2010
TIME: 08:00-9:30
ROOM: GRAND BALLROOM

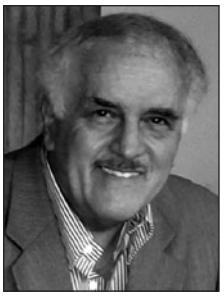
Session Chair: Dr. Youngrak Choi, Korea University, Republic Of Korea

KEYNOTE

Dr. Bulent Atalay, University of Mary Washington and University of Virginia, USA

"LEONARDO: The Artist Doing Science — The Scientist Doing Art"

Leonardo is known as a supreme artist, the creator of the two most famous works in the history of art. What is less well known is that he was only a part-time artist. His relentless curiosity to understand the world drove him to study nature, make careful observations, seek mathematical proofs, and record all his findings. Some of his discoveries prefigured achievements we associate with Galileo, Newton and Darwin. He even prefigured entire sciences not to be formally invented for centuries. With unrivaled drafting skills, he created mechanical drawings for future technology, and anatomical studies that would never be equaled. But then, when he created his miraculous paintings, he imbued them with his scientific passions — his intuitive knowledge of optics, geology and mathematics. Leonardo was in the business of inventing the future. But since he never got around to publishing his discoveries, he would not materially influence the future. Therein lies the tragedy of Leonardo.



Physicist-artist-author Bulent Atalay invokes Leonardo's model in order to attain the larger goal of achieving a synthesis of disparate fields by presenting science through art, and art through science.

Dr. Bulent Atalay was born in Ankara, Turkey. After his early education at Eton (UK) and St. Andrew's School (Delaware), site of the 1989 Robin Williams film, Dead Poets Society, he received BS, MS, MA and Ph.D. degrees and completed post-doctoral work in theoretical physics at Georgetown, UC-Berkeley, Princeton and Oxford. He is a professor of physics at the University of Mary Washington, an adjunct professor at the University of Virginia, and a member of the Institute for Advanced Study at Princeton.

He is also an accomplished artist who has presented his works in one-man exhibitions in London and Washington. His two books of lithographs, Lands of Washington and Oxford and the English Countryside, can be found in the permanent collections of Buckingham Palace, the Smithsonian, and the White House.

He lectures around the world on disparate subjects — he has spoken to physicists and engineers at NASA, physicians at Johns Hopkins and NIH, and to academics at Caltech, Stanford, and Harvard.

His highly acclaimed book, Math and the Mona Lisa (Smithsonian Books, 2004), has appeared in 12 languages. His most recent book, Leonardo's Universe (National Geographic Books, 2009) was chosen by the Encyclopedia Britannica blog writer as "One of ten must-have books for the year." After the plenary session, he will sign copies of his books for the audience. His website can be seen at www.bulentatalay.com.

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PLENARY SESSION—5

DATE: THURSDAY, JULY 22, 2010
TIME: 08:00-9:30
ROOM: GRAND BALLROOM

Session Chair: Prof. Dr. Nuket Yetis, President, TUBITAK, Scientific and Technological Research Council of Turkey

KEYNOTE-1

Professor Naim H. Afgan, Instituto Superior Tecnico, Lisbon, Portugal

"Resilience of Company Management System"

The evaluation of a company management system as a complex system is a critical goal of the modern approach to the validation of a complex system. In this context, the introduction of the Resilience Index as the aggregate indicator for the measurement of the quality of the management system is an important evaluation goal for complex systems.

The resilience management process is aimed at building an awareness of the resilience issues, selecting the essential organizational components, and identifying and prioritizing the key vulnerabilities. In the organization resilience assessment procedure, it is of primary interest to verify the vulnerability of the company management system and its structure.

Among the main attributes of the resilience procedure is the implementation of the following measures: Situation awareness is a measure of an organization's understanding and perception of its entire operating environment. Management of keystone vulnerabilities defines those aspects of an organization, operational and managerial, that have the potential to have significant negative impacts in a crisis situation. Adaptive capacity is a measure of the culture and dynamics of an organization that allow it to make decisions in a timely and appropriate manner both in day-to-day business and also in crises.

The Resilience Index of a company is determined by the sudden changes in four indicators: company profit indicator, company income indicator, product cost indicator and manpower indicator. It is defined as an additive function of the changes in the individual indicators. Four cases are presented to illustrate the Resilience Index concept in this paper.

Professor Naim Hamdia Afgan is a member of the Academy of Sciences and Art of Bosnia and Herzegovina, a Fellow of the Islamic Academy of Sciences, and Fellow of the World Academy of Art and Sciences, Washington, USA. He is a visiting professor at the Instituto Superior Tecnico, Lisbon, Portugal. Currently, Prof. Afgan is UNESCO Chair Holder for the UNESCO Chair for Energy Sustainable Management at the Instituto Superior Tecnico, Lisbon.

In his academic career Prof. Afgan has been scholar, scientist and engineer. He held the chair for Energy Engineering at the Mechanical Engineering Faculty, University of Zagreb. He has published more than 200 papers.

Recently Professor Afgan has devoted special attention to the resilience assessment of the energy system. He was among the first to introduce the energy subject on the sustainable development. His highly estimated prestige in the field of energy has led him to become interested in the engineering aspect of sustainable development. In this respect with his colleagues, Professor Afgan has made a substantial contribution in enlightening different aspects of sustainable development in the energy field. Attention is on the first place devoted to the definition of the criterion, which is to meet the sustainability merits. Based on this criterion, a methodology has been developed for the sustainability assessment of the design of energy equipment design.

Prof. Afgan was one of the founders of the International Centre for Heat and Mass Transfer. He served as scientific and general secretary of ICHMT for a number of years. He has served as the UNESCO expert for development of distance learning methodology. Professor Afgan was a member of Configuration Control Board of the Encyclopedia of Life Support Systems

Prof. Afgan has published the books Sustainability Assessment of Energy Systems (Kluwer Academic Publisher), Quality, Sustainability and Indicators of Energy Systems (Begell House Publisher), and Resilience of Energy System (NOVA Publisher 2010).

Professor Afgan was born in Banja Luka (Bosnia and Herzegovina). He obtained the university degree at the University of Zagreb and the degree of Doctor of Technical Sciences at the University of Belgrade.

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KEYNOTE-2

Dave Rauch, Sr. Vice President, Magnetic Head Operations, Western Digital Corporation (WDC)

"The Next Step in Skilled Labor Development for HDD Industry in Thailand"

As of 2007, Thailand has become the leading producer of HDDs in the world. It has been attractive for foreign direct investment due to its incentives, tax policy, labor availability and cost, and its industrial policy. In addition to remaining competitive with its neighbors in these areas, Thailand must develop a larger technical talent base to support the growth in HDD storage capacity and volume. Thailand has recognized the need for skilled labor to support the industry and has established programs to address several areas of HDD manufacturing in conjunction with industry. As HDD technology progresses, and HDD companies look to reduce development costs by transitioning more development to their manufacturing sites, new programs need to be put in place for Thailand to support these emerging trends. These programs should be focused on the unique requirements of component development in the areas of process technology vs. current emphasis on assembly technology. A proposal for academic curriculum and policy will be presented.

Dave Rauch is currently the Sr. Vice President of Magnetic Head Operations for Western Digital Corporation (WDC). In this role, he oversees the worldwide manufacturing of heads, head product development, and R&D. He has almost 30 years of experience in product development and manufacturing operations, and he has contributed in growing companies from the start-up phase to more than $1B in annual revenue, bringing products to market in diverse industries such as magnetic recording heads and optical telecommunication components and subsystems.

Prior to joining WDC, Mr. Rauch was Sr. Vice President of Operations at UltraDots, Inc., a nanotechnology start-up company, and previously he was Vice President of Engineering at Lightwave Microsystems (now Neophotonics), a producer of optical components. Mr. Rauch held a number of positions in engineering and operations at Read-Rite Corporation from 1983 to 1999. He holds a BS degree from the University of Minnesota, USA.

SPECIAL SESSIONS

COUNTRY REPRESENTATIVES MEETING

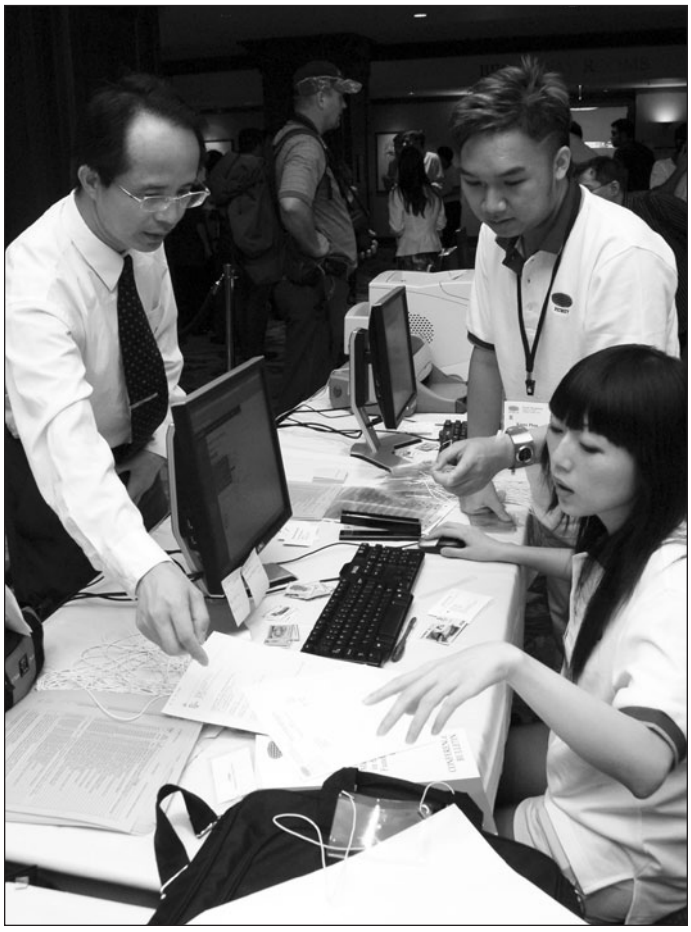
DATE: WEDNESDAY, JULY 21
TIME: 11:30 – 13:00
LOCATION: THAI THAI RESTAURANT

PICMET has 92 Country Representatives in 53 countries. They provide the linkage between PICMET headquarters and the different parts of the world by disseminating PICMET information in their regions, proposing locations for future PICMET conferences, starting PICMET chapters in their countries, and sending information to PICMET's quarterly electronic newsletter, *TM News*,. Two such chapters, PICMET-Japan and PICME-Turkey, are already in operation.

PICMET's Director of International Activities, Dr. Kiyoshi Niwa of the University of Tokyo, invites the Country Representatives and those who are interested in becoming Country Representatives to a meeting to discuss:

- The roles of the Country Representatives,
- The procedure to start and organize PICMET Chapters, and
- The requirements for holding future PICMET conferences in their countries.

Lunch will be provided.



PICMET '11 AND '12 PLANNING SESSION

DATE: THURSDAY, JULY 22
TIME: 17:00-18:30
ROOM: SIMILAN 1

This panel session will provide a chance to give feedback on PICMET '10 as well as to get involved in the planning for PICMET '11 and '12 conferences. The next PICMET will be held July 31-August 4, 2011, at the Hilton Portland and Executive Tower in Portland, Oregon, USA. The following year in will be held in China on July 29-August 2, 2012.

TUTORIALS

IMPLEMENTING PROJECT MANAGEMENT METHODOLOGIES IN ORGANIZATIONS: GLOBAL SUCCESS STORIES

DATE: TUESDAY, JULY 20
TIME: 17:00-18:30
ROOM: SIMILAN 1

Speaker: John R. Patton, President and CEO, Cadence Management Corporation, USA

What is the difference between a standard for project management and a methodology for using a standard? What are the essential elements of a methodology? How does project practice maturity influence the selection of a governance model or project management office? What is the best way to implement a project management methodology? What are the key tasks of implementation? What is the annual cycle which results in continuous improvement? How does one show executives the value of using best practices? These questions are answered by the speaker through presentation, case histories, and group discussions during this tutorial. The tutorial is targeted toward people who would like to increase productivity in their institution or obtain a sustainable competitive advantage in their company.

John R. Patton is founder of Cadence Management Corporation and creator of the methodology for practical application of practices identified in the PMI standards. He is director of the Cadence Global Solution Provider Program, consisting of native speakers, providing Cadence branded training and consulting services in the local language with the local culture in mind in various countries around the world.

Mr. Patton has been a member of the Project Management Institute (PMI) since 1983 and contributor at congresses and research working sessions on topics of project acceleration and complexity. He is currently on an editorial board to publish a PMI sponsored book on project complexity.

Mr. Patton has had experience in all aspects of organizational project management (OPM), from its roots in strategic planning into portfolios, programs and projects, through implementation into ongoing operations. In the fall of 2009 his company, Cadence, was given the Provider of the Year Award from PMI. He is a world-class consultant for companies like United Space Alliance (Space Shuttle), Starbucks Coffee, eBay, Logitech, and Boston Scientific, implementing his methodology and facilitating rapid project start-up planning.

Mr. Patton serves on the Advisory Board of the Department of Engineering and Technology Management, Maseeh College of Engineering and Computer Science, Portland State University (PSU), USA. Mr. Patton obtained an MBA from PSU; a diploma from the University of Barcelona, Spain; and an undergraduate degree in Arts and Sciences from the University of Oregon, USA.

REAL PROJECT COSTS: WHAT YOU SHOULD KNOW AND WHY NO ONE LISTENS!

DATE: WEDNESDAY, JULY 21
TIME: 13:00-14:30
ROOM: SIMILAN 1

Speaker: Jeffrey S. Busch, PMP; Portland State University, USA

It is difficult to pick up an article, newsprint or periodical that does not discuss the financial distress of businesses during these economic times. This abstract is not excused. "Do less more with less" and "do less with less" is a popular *CIO* (*Chief Information Officer magazine*) slogan for the semiconductor, IT and cyberspace industries. The forecast for 2010 does not include a significant jump back to 2007 budget levels. Aptly applied, the cut-list for active and proposed projects is getting shorter. Prioritization of only the highest ranked, most ROI or business-critical cost saving projects are making the cut. To quote the CEO of *CIO*: "Based on the current economic conditions, everything within IT is being seriously re-examined. Efficiency and ROI continue to be top-of-mind, while increasing work force productivity and innovation are equally essential." In other words, what alternative solutions can free businesses from their systems and processes rather then just the traditional approaches? A *CIO* contributor has stated that it is time to take a second look at where you are spending money. So, if you are in technology management and your business initiative is economic growth but it does not spend any money, what do you? Businesses need projects to be innovative, businesses need projects to remain competitive, businesses need projects to be efficient, and projects cost money. So, how much are businesses willing to spend to achieve fiscal initiatives? Most will put the squeeze on the costly and outrageous, but do they know how much they are

TUTORIALS

even spending on the obvious, must-do or business-critical projects? Probably not, and they are not listening.
This tutorial will present what we should know and can do when it comes to project costs. It will further define cost essentials, lay out various methods for estimating and forecasting costs, and explore business processes that support the financial aspects of projects.

Jeffrey S. Busch is a recognized authority on project management, scheduling and alternative dispute management with more than 30 years of experience covering consulting and training for various industries including design/construction, product development/manufacturing and semi-conductor/IT/software across the US and the globe. In 2003 he retired from a principal position at Pinnell-Busch, Inc., a leading project management firm that seeks out new ventures and challenges in project management. He provides independent consulting, is a senior consultant/trainer with Cadence Management Corporation, and teaches as an adjunct professor at Portland State University, USA. He has worked for such organizations as eBay, Starbucks, Boston Scientific, Network Appliance, Kimberly-Clarke, AT&T Federal Systems, CH2M Hill, Northwest Natural Gas, Boise, Freightliner, Tektronix, Nike, AMD, Polaris Industries, Tyson Foods, Rockwell Collins, Spansion and Johnson & Johnson. As a practitioner he has facilitated consulting and training sessions for federal, state and local governments and more than 300 corporations in the US and abroad. He has served on committees with PMI Global Operations, including a 2006/07 role as a core team lead with PMI Standards for the development and publication of the Second Edition of the Construction Extension (2008) to the *PMBOK Guide*.

Mr. Busch is an active partnering facilitator and is often called upon for roles in project intervention and recovery, project alignment, and as an independent neutral. He is qualified as an expert witness for the US Federal District Court, the US Court of Federal Claims and numerous state court systems.

Mr. Busch has been active with PMI since 1985. He received his PMP in1991 and has served the PMI Portland Chapter in numerous capacities including VP of Programs and a two-year term as its President. He is currently serving as CEO of the PMI Willamette Valley Chapter, Oregon, USA.

PhD Colloquium

GETTING YOUR PH.D.… AND BEYOND CRITICAL STAGES AND CAREER PATHS FOR THE PH.D. STUDENT

DATE: WEDNESDAY, JULY 21, 2010
TIME: 13:00—16:30
LOCATION: ARCADIA HALL 2
REGIST.: INCLUDED IN CONFERENCE REGISTRATION FEE

The PICMET Ph.D. Colloquium is targeted at students in all stages of the Ph.D. process, as well as recent graduates. Through guest lectures and workshop discussions, we will cover various aspects of PhD education and career opportunities in engineering and technology management, including:

- The Ph.D. process and career paths in different countries
- Critical stages in the Ph.D. process and how to successfully master them
- Coping with possible personal problems while pursuing a Ph.D. (lack of time or motivation, problems with advisers, insufficient time for family and friends, etc.)
- What's next - academia or industry?
- Entering the academic job market as future junior faculty
- Landing your first industry job
- To publish or to perish?

The colloquium provides a unique opportunity to meet colleagues, share experiences and ideas, and network with students and faculty from different countries and university systems.

We encourage students in all stages of the Ph.D. process, as well as recent graduates, to join us.

SESSIONS

MA-01 PLENARY - 1

DATE: 7/19/2010
TIME: 08:00 - 09:30
ROOM: BALLROOM A
CHAIR: PANSAK SIRIRUCHATAPONG, NECTEC, THAILAND

MA-01.1 Science Technology and Innovation: Policy and Management Perspectives

Pichet Durongkaveroj; National Science Tech. & Innovation Policy Office, Thailand

Science, technology and innovation (STI) increasingly plays a dominant role not only in the advancement of the science and the technology itself, but also in its contribution to citizen empowerment, productivity improvement, corporate innovativeness and quality of life enhancement. The design of STI policy is relatively complex yet requires focus: it must move toward competitiveness and excellence yet it must be integrative, transparent and participative; it must think globally yet act mainly domestically and locally. Society also looks to STI policy and management not only for trade and economic purposes, but also for social objectives such as poverty reduction and social equity. To manage STI policy effectively requires political will, leadership, social awareness, understanding, and in many cases social acceptance. Thailands 10-year STI Plan will take these challenges to the level where changes can be implemented and sustainable development, possibly through the sufficiency economy philosophy, can be achieved.

MB-01 Strategic Management of Technology - 1

Monday, 7/19/2010, 10:00 - 11:30
Room: Ballroom A
Chair(s) Antonino Ardilio; Fraunhofer Institute for Industrial Engineering

MB-01.1 [R] Win3 - A SME-Customized Approach Towards a Sustainable Technology Strategy

Antonino Ardilio; Fraunhofer Institute for Industrial Engineering, Germany
Joachim Warschat; Fraunhofer Institute for Industrial Engineering , Germany

Unfortunately, the majority of the SMEs do not or not enough deal with strategic issues. Often the SMEs are not sensitized or are rather scared of the laborious process behind the formulation of such a strategy. In many cases companies do not have either a clearly enunciated corporate strategy or a vision of the future on which the technology strategy can be elaborated. This paper introduces a methodology for the formulation of the technology strategy based on competence management through a technology-function matrix, which especially meets SME-specific conditions (undefined corporate strategy, unclear picture of the future, limited resources, etc.). Three types of benefits (wins) for the SMEs will be discussed within a use case. The first win results from the future fields recognized as relevant, the second win emerges from the elaborated application ideas within these fields, and the third win represent the technology strategy derived from the actual product portfolio within the most promising future applications.

MB-01.2 [A] An Integrated Model of Text Mining and Chance Discovery for Strategic Planning on Thin-film Solar Cell Technology

Tzu-Fu Chiu; Aletheia University, Taiwan
Chao-Fu Hong; Aletheia University, Taiwan
Ming-Yeu Wang; National Chiayi University, Taiwan
Yu-Ting Chiu; National Central University, Taiwan

Technological strategies are essential for a company and its stakeholders so as to retain the competitive advantages of a company and to facilitate appropriate investment decision-making of stakeholders. Solar cell, one of the renewable energies, is growing at a fast pace with its long-lasting and non-polluting nature. In order to provide a possible approach for technological strategy generation, an integrated model has been proposed where text mining is employed to perform the cluster analysis, and chance discovery is adopted to conduct the association analysis (via KeyGraph and data crystallization). Therefore, the technical topics will be produced after the cluster analysis; the subtopics will be created after the KeyGraph generation; and the relations between/among companies and techniques (subtopics) will be recognized after the data crystallization. Consequently, the relation patterns have been identified from the relations between/among companies and techniques. Finally, according to the relation patterns, the strategic suggestions of thin-film solar cell technology have been generated for companies and stakeholders.

MB-01.3 [R] Enhancing Green Competitive Advantage through Environmental Commitment and Green Intangible Assets: In the Information and Electronics Industry of Taiwan

Ching-Hsun Chang; National Central University, Taiwan
Ming-Ji James Lin; National Central University, Taiwan

This study explores the positive effects of environmental commitments and green intangible assets on green competitive advantages of companies in the information and electronics industry of Taiwan. The results showed that environmental commitments and green intangible assets of companies were positively associated with their green competitive advantages. Investments in the environmental commitments and green intangible assets were helpful for the green competitive advantages enhancement. Furthermore, this study demonstrates that there were advantages of firm size on the environmental performance in the information and electronics industry of Taiwan. This study found that environmental commitments, green intangible assets, and green competitive advantages of small and medium enterprises (SMEs) were all less than those of large enterprises in the information and electronics industry of in Taiwan. Hence, there was the advantage of firm size for the environmental commitments, green intangible assets, and green competitive advantages in this industry in Taiwan, and it is imperative for SMEs to develop their environmental commitments and green intangible assets to strengthen their green competitive advantages.

MB-01.4 [A] Strategic Issues in Jatropha Biofuel Enterprise Development in Nigeria

Ibihunle O Ogundari; National Centre for Technology Management (NACETM), Nigeria
Oluwatosin G Oladipo; National Centre for Technology Management (NACETM), Nigeria
Akin J Famurewa; National Centre for Technology Management (NACETM), Nigeria
Godwin A Ali; National Centre for Technology Management (NACETM), Nigeria
Titilayo O Aladesanmi; National Centre for Technology Management (NACETM), Nigeria
Ademola D Ogunkanmbi; National Centre for Technology Management (NACETM), Nigeria
Willie O Siyanbola; National Centre for Technology Management (NACETEM, Nigeria

In Nigeria today, fossil fuels constitute the major source of energy for the economy with consumption costs in excess of N 654 billion for petrol, N 303.2 billion for diesel and N 194 billion for Kerosene. The global debate on Climate Change/CO2 emissions and domestic concerns on economic, environmental and energy security implications have necessitated alterative energy options and created opportunities for sustainable biofuel enterprise in Nigeria. Jatropha curcas (known as Lapalapa in Yoruba-speaking parts of Nigeria) is an uncultivated non-food wild-species plant with great potential for bioenergy development in the country. The seeds are resistant to a high degree of aridity and contain 27-40 percent oil that can be processed to produce a high-quality biodiesel fuel, usable in a standard diesel engine. With estimated diesel demands in Nigeria being 3600-4200 thousand metric tonnes by 2020, there is an expansive opportunity for jatropha biofuel enterprise in the country. This study examines the strategic issues (technological, economic, environmental, and socio-cultural) governing its development and proposes policy recommendations for its successful exploitation.

MB-02 Knowledge Management - 1

Monday, 7/19/2010, 10:00 - 11:30
Room: Ballroom B
Chair(s) Charles M Weber; Portland State University

Note: [R] = Research Paper; [A] = Industry Application

MB-02.1 [R] Managing Effective Knowledge Acquisition in International Outsourcing Alliances

Wei-Li Wu; Ching Yun University, Taiwan
Ryh-Song Yeh; Yuan Ze University, Taiwan
Chien-Hsin Lin ; Yu Da University, Taiwan

We can clearly observe that knowledge acquisition (KA) through international outsourcing alliances has been playing a key role for firms to increase their technology capability. However, the acquisition of knowledge is not easy; it relates to the level of a learning firms learning ability, the quality of partnership, cross-national communication, and knowledge ambiguity, etc. In the previous studies, there was little research focusing on the perspective of suppliers in newly industrialized economies (NIEs) to discuss KA, and the usefulness of information technology in the learning process is often overlooked. Therefore, there still exist some research gaps. Based on the suppliers angle, this study will explore the differences between suppliers with more effective KA and suppliers with less effective KA. Depending on a sample of 204 cases of international outsourcing alliances is collected and tested, we find that learner characteristics, partnerships and use of information technology are the main factors to cause different results of suppliers KA. Also, this study depicts the different learning patterns of tacit KA and explicit KA.

MB-02.2 [R] Knowledge Protecting Methods in Different Types of Companies

Bin Xu; National University of Singapore, Singapore
Kay Chuan Tan; National University of Singapore, Singapore

The importance of knowledge protection (e.g. IP protection) has long been recognized for maintaining continuous revenue and promoting innovation in companies. However, it is also suggested that IP protection is not the only method for knowledge protection and its application to service industries is not yet mature. In this paper, we classify businesses according to their offering types (services or products) and customer serving styles (routine-based or knowledge-based), and investigate their differences in protecting methods. Interviews are conducted in Singapore and China towards top managers. Several results have been reached. Firstly, routine-based companies focus more on the efficiency of production and supply chain. Meanwhile, knowledge-based companies focus more on the morality of employees. It is also noticeable that with a long-term reputation or a strong mother company, the effect of morality decreases. Secondly, IP application is more often used in product-centered companies. However, in China, the main purpose of application is often not for protection but for governmental support. The Governments special allowance is considered more effective in protecting some of the companies or products, regarding their unique functions.

MB-02.3 [R] Methodology for Analyzing Case Studies

Frederick Betz; Portland State University, United States

Case studies provide the basis for empirical grounding of management theory or management principles. But there needs to be a systematic methodology for constructing case histories so that theory and principles can be compared to case reality. The author proposes such a methodology and illustrates the use of the methodology in a famous business case of the origin of Cisco Systems.

MB-03 Technical Workforce - 1

Monday, 7/19/2010, 10:00 - 11:30
Room: Similan 1
Chair(s) Calvin S Weng; Takming University of Science and Technology

MB-03.1 [R] A Study of Team Effectiveness Influenced by the Fitting between Team Personality Composition and Team Virtualization Level

Mei-Ling Wang; Hungkuang University, Taiwan

With the development of information technology, types of organizations and the nature of management have changed, and boundaries between organizations have diminished. The newest type of work group to emerge is the virtual team. Team composition affects team effectiveness. Most team composition research has focused on the visible variable characteristics, such as demographic variables, but the implicit personality variables were ignored. Based on Big Five factors, including neuroticism, extraversion, openness to experience, agreeableness and conscientiousness, we explore the effect of team personality composition on team virtualization level and team effectiveness. The study sample consisted of 62 completed team questionnaires (filled out by 62 team leaders and 234 team members) from 49 enterprises in the information and electronic industries. The results are as follows: Positive and active team and negative and passive team were classified according to team personality composition. Compared to a negative and passive team, a positive and active team personality has higher conscientiousness, extraversion and lower neuroticism, and positive and active teams virtualized level has better effect towards task performance and cooperation satisfaction.

MB-03.2 [R] The Relationship between Attachment Style and Leader-Member Exchange

Hui-Ying Hsu; Kun Shan University , Taiwan
Shang-Ping Lin; National Yunlin University of Science & Technology, Taiwan
Wan-Yu Chen; Transworld Institute of Technology, Taiwan

Leader-member exchange (LMX) has been found to have significant and positive impacts in organizational leadership studies. Thus, it is important to conduct further study of the antecedents of LMX. Based on the fact that past research has been less concerned about the subordinates intentions in dealing with interpersonal emotions, this study used subordinates attachment styles as the antecedent of LMX, in which the theory of mind was used to explain the interactions between leaders and their members. First, the questionnaires of pre-test were collected and conducted with the item analysis, exploratory factor analysis, reliability analysis, and validity analysis for the development of the official scale. Official data was collected in six technological universities located in mid-Taiwan. Samples are students engaging in full-time jobs who study in the Department of Continuing Education of these six universities. Two hundred twenty seven valid questionnaires were collected. The confirmatory factor analysis, reliability analysis, and validity analysis were conducted to see the goodness-of-fit between the collected data and the measurement model. Furthermore, the test of structural model was processed to testify the relationships between the exogenous latent variables and the endogenous latent variables. Finally, SEM (structural equation modeling, LISREL8.80) was used to testify the proposed hypothesis. The result of this study indicated that the different attachment styles of subordinates had impacts upon the development of LMX.

MB-03.3 [R] Person-Environment Congruence as a Predictor of Organizational Commitment and Job Satisfaction: Evidence from a Transnational Manufacturing Company

Wan-Yu Chen; Transworld Institute of Technology, Taiwan
Calvin S. Weng; Takming University of Science and Technology, Taiwan
Hui-Ying Hsu; Kun Shan University, Taiwan

Person-environment (P-E) fit has long been a focus in organizational research. Previous studies of manufacturing management have ignored a critical factor: the fit between the organization and employees. To address this oversight, this study focuses on organizational culture and person-environment fit and their relationship to organizational commitment and job satisfaction for manufacturing workers. A value-based measure of P-E fit was used in organizational and individual assessment. The organizational culture was investigated for executive managers from the company. The personal value, organizational commitment and job satisfaction were investigated for employees in China and Taiwan from the company. A completed questionnaire from 85 managers and 271 employees of a transnational manufacturing company formed the basis of our empirical analysis. A significant positive correlation was found between P-E fit and organizational commitment and job satisfaction. We discuss our findings in terms of their implications for management practices and future research.

MB-03.4 [R] The Effect of Task Characteristics on Team Norms, Cohesion

and Effectiveness of Cross-functional Teams in Hospitals

Mei-Ling Wang; Hungkuang University, Taiwan

Hospitals are served by a variety of different specialists and technicians, including doctors, nurses, pharmacists, medical technicians, radiologists, etc. To provide good healthcare services, the management of cross-functional teams is a significant issue in hospitals. Norms are powerful influences in teams, and the existence of norms is necessary for effective team functioning. Team cohesion can have important implications for productivity and effectiveness. For teams, task characteristics are noticeable dimensions, and they affect the relationship between team structure and team effectiveness. Therefore, we explored four main variables (team norms, team cohesion, team effectiveness and task characteristics). In this study of task characteristics, task interdependence, task uncertainty, and task analyzability are mentioned. We measured team effectiveness in terms of performance and satisfaction. In this study, using 109 valid questionnaires samples from 20 hospitals in Taiwan, we found that 1) the greater task interdependence, the greater team cohesion and the lower its task performance; 2) the greater team uncertainty, the greater team norms and the lower its task performance; 3) the greater team uncertainty, the greater team norms and the lower its meeting satisfaction.

MB-04 Patent Analysis - 1
Monday, 7/19/2010, 10:00 - 11:30
Room: Similan 2
Chair(s) Shann-Bin Chang; Ling Tung University

MB-04.1 [R] The Impact of Patent Trait upon Firm Performance in the American IC Design Industry: The Role of the Advantage of Firm Size

Yu-Shan Chen; National Taipei University, Taiwan

This research explored the influence of patent profile upon firm performance via the advantage of firm size from the three patent indicators: number of annual new granted patents (NANGP), relative patent position of a firm in its most important technological field (RPPMIT), and the Herfindahl-Hirschman Index of patents (HHI of patents) in the American IC design industry. The results indicated that NANGP and RPPMIT were positively related to firm size, but HHI of patents was negatively associated with firm size. In addition, this study found that there was the advantage of firm size in the IC design industry of the US. Therefore, if IC design companies of the US want to enhance their firm sizes to capture the advantage of firm size in order to enhance their performances, they should raise their technological competences and their leading positions in their most important technological fields, and cultivate wider technological diversities.

MB-04.2 [R] Valuable Patent or Not? Depends on the Combination of Internal Patent Family and External Citation

Yu-hsin Chang; Yunlin University of Science and Technology, Taiwan
Wen Goang Yang; Chaoyang University of Technology, Taiwan
Kuei Kuei Lai ; Yunlin University of Science and Technology, Taiwan

In this article, we are going to find out the patents real value through patent damage awards. A damage award is what a patent fights to win. It might be a good approach to get patent monetary value. We find out a significant variable of forward citation representing deserved external reputation earned. Although family size is not significant, it provides better protection as internal portfolio planed. A new joint random variable, earn plan ratio (EPR), forward citation counts divide by family size, stand for whether a company internal strategic plan could earn external reputation. A low EPR represents that a company might put too much resource into less competitive innovations. It could help a company get its best patent portfolio management.

MB-04.3 [R] An Integrated Technological Position Model from Two Different Strategic Approaches: Using Patent Analysis

Shann-Bin Chang; Ling Tung University, Taiwan

Discussions on business strategy formation in the past 50 years can be separated into two categories: the inside-out and the outside-in approach. Technology is a critical factor when managers formulate their business strategy, and patents have served as an important indicator of technology. A patent portfolio can be used to understand the capabilities of a firm, as an inside resource pattern; and the patent citation of firms can be used to find the relationship of a firm, as an outside dependency. This study uses patent information to establish an effective model for the technological position of business methods. The 5 by 6 matrix was generated and four situations between firms were induced. Researchers and managers can use that matrix and situations to recognize the real competitors or cooperators, and formulate the technological strategies which include competition, cooperation, or complementary cooperation.

MB-04.4 [R] Intellectual Property and Information on Intellectual Property Rights Management of Japanese Pharmaceutical Companies in M&A

Yosuke Shibata; Tokyo Institute of Technology, Japan
Toru Takahashi; Tokyo Institute of Technology, Japan
Tomoko Saiki; Tokyo Institute of Technology, Japan

It is important for a pharmaceutical company after a merger and acquisition (M&A) to intentionally manage the intellectual property (IP) and information on intellectual property rights (IPRs) of the two companies involved in the M&A. We examined IP management in two cases of M&A of Japanese pharmaceutical companies using IP management indices, including the proportion of patent applications for which requests for examinations were filed. Also, we interviewed the IP management departments of pharmaceutical companies regarding IP and IPR information management. As a result, it was demonstrated that, in the cases of M&A of two new-drug companies, 1) The ways of managing IP protection of the companies before M&A are different with each other or similar in each IP management indices; 2) The ways of managing information on IPR in the new drug companies before M&A could be blended with little difficulties because of their similarity with one another.

MB-05 Innovation Management - 1
Monday, 7/19/2010, 10:00 - 11:30
Room: Arcadia Hall 1
Chair(s) Deok S Yim; Gyeonggi Research Institute

MB-05.1 [R] Evaluation of Gwanggyo Technovalley in Korea and Policy Implication for the Regional Innovation

Deok S Yim; Gyeonggi Research Institute, Korea, South
Jung S Kim; Daedeok Innopolis Welfare Center, Korea, South
Jong B Im; Konkuk University, Korea, South
Soojin Kim; Gyeonggi Science & Technology Center , Korea, South

The effectiveness of an innovation cluster approach is well acknowledged in the science and technology policy. There are many successful cases that the innovation clusters are leading the national or regional competitiveness. However, it is also true that there are many cases which do not produce the expected innovation. In this sense, a regional case of Korea was reviewed with other two international cases (Oulu Technopolis and Research Triangle Park). As the leading innovation cluster of a region (Gyeonggi Province, Korea), Gwanggyo Technovalley (GTV) hosts research institutes, universities and many small and medium companies. Its hardware development was completed in 2008, but there are many problems such as networking among innovation actors, marketing of GTV and so on. In addition, there is no managerial body and a master plan and therefore has some difficulties to market it and coordinate activities among the tenant companies and research institutes within the complex. These problems occurred because of inappropriate policy making and regional political conditions, which request fast results from the innovation policy. The GTV case may not be generalized; however, it shows one of the typical problems of regional government initiated innovation cluster. It is suggested that the policy makers of innovation clusters in the region should pay more attention to a creating a long-term development plan and installing the right management body in the innovation cluster.

MB-05.2 [R] Platform-based Innovation Management: Directing External

Innovational Efforts in Complex Self-organizing Platform Ecosystems

Simone Scholten; SAP Research, Germany
Ulrich Scholten; University of Karlsruhe , Germany

Modular platforms have become the centerpiece of collaborative value creation in customer-driven platform ecosystems. Platform ecosystems co-create the platforms value proposition and support its market adoption as the more complementors join the ecosystem to supply complementarities, the more valuable the platform becomes to customers due to a greater variety of choice. This poses new requirements on managing innovation in open platform environments. While academic research stresses the relevance of complementary innovation for platform success, it lacks, however, a concrete understanding of how platform operators can direct external innovational efforts in complex self-organizing ecosystems to co-create and deliver value while ensuring the overall quality, reliability, and consistency of the whole product. Based on case study results, this paper presents a categorization of control mechanisms currently applied in platform markets, enabling the platform operator to steer external complementary innovation within the context of a platform strategy. From that an overall platform-based innovation management process is developed.

MB-05.3 [R] Positive or Negative: Impact of Foreign Patent Pools on Innovation Capabilities of Local Firms in China

Nili Ha; Beihang University, China
Xi Yang; Beihang University, China
Xiangdong Chen; Beihang University, China
Xiaoqing Liu; Beihang University, China

High-tech companies in developing countries such as in China often encounter evolution problems in innovation capability, typically in fast-growing technical fields such as ICT or bio-technology. The major challenge comes from overseas technical superpowers with their patented sources, typically in patent pool cases. Interesting debates have been continually developed on functions of patent pools initiated and organized by overseas companies: is such exogenous power generates positive technology spillover through competition or negative pressure over innovation capabilities of local firms in China. This study is conducted on this patent pool issue, particularly on this impact nature, through investigation of patent records in China over corresponding technical fields where international patent pools are operating by member companies. DVD, as one of the typical pools operating in China, is a major focus in this paper. The impact level by patenting and granted patents of In Pool Firms (IPFs) upon other Non-Pooled Firms patenting and granted patent is studied. Particularly, four different kinds of impact situations are analyzed.

MB-05.4 [R] Impact of R&D Intensity on the Firm Growth: Evidence from Korean Manufacturing Firms

Jeong-Dong Lee; Seoul National University, Korea, South
Jeong-Sook Han; Korea Inst. of Energy Tech. Evaluation & Planning, Korea, South
Chul-Woo Baek; Korea Institute of S&T Evaluation and Planning, Korea, South

The objective of this study is to demonstrate the impact of R&D intensity on growth of manufacturing firms in Korea. The data on the listed Korean manufacturing firms from 1985-2005 were used for the panel analysis and the firm growth factors around Asian financial crisis in the 1990s were compared and analyzed in whole industry and high-tech industry. The following conclusions have been drawn from the result: 1) the R&D intensity became almost double passing Asian financial crisis; 2) after the financial crisis in the entire manufacturing industry, it showed that there was positive R&D premium effect on the growth of the firm; 3) the R&D premium impact in the high-tech industry was less than the mean impact of the whole industry. In addition, in high-tech industry, it showed that the higher productivity firms, younger firms and smaller size firms have more advantage in growth.

MB-06 Technology Adoption and Diffusion - 1
Monday, 7/19/2010, 10:00 - 11:30
Room: Arcadia Hall 2
Chair(s) Nathasit Gerdsri; Mahidol University

MB-06.1 [A] Exploring Antecedents of User Intention through a Flight Reservation System

Cagla Ozen Seneler; Bogazici University, Turkey
Nuri Basoglu; Bogazici University, Turkey
Tugrul U Daim; Portland State University, United States

Information systems (IS) have the potential to play a critical role in improving the lives of people. However, no matter how IS benefits the organizations, technology adoption problems may be faced and hinder IS advantages. Acceptance of system designs have become a focal interest in IS research, yet at present there is a lack a detailed understanding of which system design features and technology adoption aspects influence them. Considering the facts above, a series of qualitative and quantitative studies were conducted in order to model users' intention to use an IS system. The results will be important to developers who want to create interfaces that facilitate user acceptance.

MB-06.2 [R] Consumer Decision-Making, Perceived Product Value, and Purchasing Behavior in the Taipei Digital Camera Market

Ke Ming Hung ; Yu-da University, Taiwan
Yi-Hsien Tu; Minghsin University of Science & Technology, Taiwan

This study examined consumers decision-making styles by using the Consumer Styles Inventory (CSI) by Sui, Hui, Wang, and Chang (2001). It also investigated the relationship between the decision-making styles and the perceived value (PV) (Teas & Agarwal, 2001) when purchasing digital cameras and related equipment. The independent sample t test and multiple regression were used in analyzing the data. The results of the study indicated that the consumers with price-value consciousness decision-making styles had a positive relationship with perceived product quality and had a negative relationship with perceived product value and perceived performance risk. The consumers with perfectionism decision-making styles had a negative relationship with perceived sacrifice and perceived financial risk. The consumers with confused by over choice decision-making styles had a positive relationship with perceived product quality, and had a negative relationship with perceived product value and perceived product performance risk. Marketing managers could use this information to target consumers which had certain traits in these decision-making styles.

MB-06.3 [R] An Empirical Study of IT Adoption in Rural Areas of Thailand

Chalee Vorakulpipat; NECTEC, Thailand
Siwaruk Siwamogsatham; NECTEC, Thailand
Apinya Kamolsook; NECTEC, Thailand
Pimchatra Jamchudjai; NECTEC, Thailand

The objective of this empirical study is to review the current status of communication and IT practices in rural areas. In particular, the study explores the local peoples expectation and readiness to embrace new technology like WiMAX in rural areas. Mae Hong Son, one of the very rural areas in Northern Thailand, was chosen as a case study. The initial survey involves a number of local people in four rural areas using the stratified sampling technique. The results indicate that (a) the communities have an increased awareness of IT adoption, in particular broadband and long distance internet, to improve education, knowledge, economy, and overall quality of life; (b) a clear lack of computer and hardware, infrastructure, and budget for human development are the major problems preventing people from accessing the internet; (c) IT adoption creates intangible values including human development, learning, and training skills. On the other hand, the communities also demonstrate some disadvantages caused by IT adoption. Finally, this empirical study provides a foundation to further research IT adoption in rural areas in terms of socio-economic impacts.

MB-06.4 [A] Technology Adoption: A Case Study of ERP Implementation in One of Healthcare Organizations in Thailand

Chonyacha Suebsin; Mahidol University, Thailand
Nathasit Gerdsri; Mahidol Univeristy, Thailand

This paper addresses the factors that affect technology adoption within a healthcare organization. A case study of the adoption of enterprise resource planning (ERP) is conducted

through a series of in-depth interviews to explore the situation of technology adoption in one of the leading private hospitals in Thailand. Five factors were derived from the study: routine job, user resistance, ERP capability, complexity, and change of work process.

MB-07 Quality Management - 1
Monday, 7/19/2010, 10:00 - 11:30
Room: Lagoon Hall 1
Chair(s) Kemlall Ramdass; University of Johannesburg

MB-07.1 [R] Context of TQM Application for NPD in Developing Countries: An Empirical Study on Deming Prize Winners from India and Thailand

Fasil Taddese; Tokyo Institute of Technology, Japan
Hiroshi Osada; Tokyo Institute of Technology, Japan

Developing countries are challenged with intense market competition and are yet to make significant strides in their business performance. Although total quality management (TQM) and new product development (NPD) can play major roles in this case, empirical research done in justifying TQMs applicability for NPD is limited. Hence, this research is dedicated to studying the applicability, methodology, and effects (tangible and non-tangible) of TQM on NPD. The result shows that TQM is effectively used for the development of adaptive products through improvements in production technology, NPD system, product development, production process, and employee know-how. It is also found that TQM revolutionizes conventional R&D systems in reducing development costs and time enhancing the innovation capabilities with limited financial commitment in the developing countries.

MB-07.2 [R] Service Quality in Academia: A South African Experience

Kemlall Ramdass; University of Johannesburg, South Africa

As competition intensifies and environmental factors become more hostile, the concern for service quality grows. Student numbers have become a focal point in the offering of programs. With regular quality audits, academia prioritizes the fulfillment of the HEQC criteria, but lacks the provision of service quality to the student. If service quality is to become the cornerstone of marketing strategy, the marketer must have the means that differentiates the different academic institutions in SA. Service quality is considered a critical determinant of competitiveness. Attention to "service quality" can help an organization to differentiate itself from other organizations and through it gain a lasting competitive advantage. High quality of service is considered an essential determinant of the long-term profitability not only of service organizations, but also of manufacturing organizations. In some manufacturing industries "service quality" is considered a more important order winner than "product quality". Superior "service quality" is a key to improved profitability, and not the cost of doing business. Exemplary service is the next sale in the making. The methodology of the research comprises a qualitative, exploratory and descriptive design. Relevant literature in conjunction with national and international trends was used to understand how best practices could be employed.

MB-07.3 [R] TQM Implementation in Construction Industry: Jordan Case

Jamal M Assbeihat; Al – Balqa Applied University, Jordan

As the construction sector is a vital economic sector in Jordan, this work was carried out to find the factors that form the vision of contractors and engineering offices and prohibit them from adopting TQM criteria in Jordan. A questionnaire has been developed with two approaches for data collection. It is arranged into three main groups; each group contains three sub groups. Proper statistical methods were adopted for analysis and comparisons. The results showed that many construction firms had difficulty distinguishing TQM from the ISO. The majority have a negative trend and vision to implement TQM. Different factors, mainly the cost, prevent construction firms from applying TQM. The most effective factors encouraging the positive vision was ensuring the commitment for the consumer and offering a better work environment. There was a high correlation between the grade and vision for both contractors and engineering offices; the less the grade, the more negative its vision will be.

MB-07.4 [R] Overall Worker Effectiveness (OWE) Towards Six Sigma Level Output in Small and Medium-Sized Manufacturing Enterprises: A Micro Analysis of Factors Affecting

Nagraj L Hiregoudar; BV Bhoomaraddi College of Engineering & Technology, India
Bhimasen Soragaon; BV Bhoomaraddi College of Engineering & Technology, India

The basic components in the conversion process of inputs to outputs in any manufacturing setup are materials, machines / equipment, human element and methods. In a conventional manufacturing enterprise, an important section of the human element is the production-worker who plays a vital role in the conversion of raw materials into finished products at the desired quality level. The major asset of most manufacturing SMEs in India is their workforce, which has a significant influence in smaller, less automated companies. Since most small- and medium-sized manufacturing enterprises (SMMEs) form the supply base of large organizations and are adopting strategies such as Six Sigma for their business process improvement, it is necessary for SMMEs to carry out manufacturing operations at/near Six Sigma level, too. Given that a fairly sound technology and materials of desired specifications for the conversion process are in place, SMMEs need to improve the overall effectiveness of their workforce for achieving output of Six Sigma qualities. In this paper, an attempt is made to identify and investigate the influence of various factors on the components of overall effectiveness of the production-worker at work.

MB-08 Environmental Issues - 1
Monday, 7/19/2010, 10:00 - 11:30
Room: Lagoon Hall 2
Chair(s) Mel Horwitch; Polytechnic University

MB-08.1 [R] Corporate Activity and Environmental Regulation: The Environmental Regulation 'REACH' and European Manufacturers of Plasticizer

Kenji Nagasato; Tokyo Institute of Technology, Japan
Koji Tanabe; Tokyo Institute of Technology, Japan

The movement to integrate industry policy into environmental regulation has been observed in the European Union today. Now the practice of environment management is one of the most important activities for enterprises, and some enterprises attempt the differentiation from other companies by their own activities for considering the regulatory control. In the environmental regulation REACH in Europe, new concepts, "New approach" and "Precautionary Principle," are introduced, and the method in which enacting regulatory controls by interacting with industrial associations and consumers is adopted. In this paper, it is analyzed that the corporate activity of a European multinational company would have influenced the decision of prohibited chemicals under "REACH.

MB-08.2 [R] An Integrative Food Handling System for Managing Inventory Information in Food Warehouses

S.I. Lao; The Hong Kong Polytechnic University, Hong Kong
K.L. Choy; The Hong Kong Polytechnic University, Hong Kong
Y.C. Tsim; The Hong Kong Polytechnic University, Hong Kong
S.K. Kwok; The Hong Kong Polytechnic University, Hong Kong
T.C. Poon; The Hong Kong Polytechnic University, Hong Kong

In today's competitive business environment, gathering inventory information is an extremely important practice for logistics parties. This is because this information is essential for managers who have to decide long term and short term resource allocation plans. Proper management of inventory is especially important in the food industry because food which can easily deteriorate is in great demand and relies on a quick response and a fast supply chain. However, the existing resource management approaches adopted in food warehouses are not satisfactory. A limited number of companies have applied systematic ways to manage inventory information, so a lot of food deteriorates and stock is sometimes kept in storage after the expiration of its use-by date. The aim of this paper is to provide an Integrative Food Handling System (IFHS) for managing inventory information in food

warehouses. It is an inventory information management system, which contains a notification mechanism, and a facilities allocation and stock picking decision support system. The notification mechanism can help control the variations of the storage environment by informing staff when variations occur. The decision support system can help minimize loss of inventory caused by deterioration, contamination and expiry. With the introduction of IFHS, the food industry can utilize inventory information, and manage the food handling process, more effectively.

MB-08.3 [A] EMS and Its Effectiveness in Indian Organizations

Vinod K Khanna; Galgotia Institute of Management Technology, India

Chinas world share of ISO 14001 certified companies went up from 9.98 percent as of April 2005 to 14.70 percent as of December 2006 / January 2007. For the same period, Indias world share went down from 1.7 percent to 1.16 percent. One of the reasons for its low growth in Indian organizations could be attributed to the feeling that it is not achieving the desired benefits. Therefore, research has been undertaken to understand the effectiveness of benefits achieved by Indian organizations, and further correlation between maturity level of EMS and its effectiveness will also be established. A comprehensive questionnaire has been designed to survey the maturity level of EMS and its effectiveness in each category of Indian organizations. The survey questionnaire will help to establish the present status of the EMS maturity level and its effectiveness in accruing benefits. The paper reveals that EMS maturity level has a direct bearing on the effectiveness of EMS.

MB-09 Technology Management in Semiconductors Industry - 1
Monday, 7/19/2010, 10:00 - 11:30
Room: Business Center
Chair(s) Samar K Saha; University of Colorado at Colorado Springs

MB-09.1 [A] Industry Clusters' Effect on IC Design Firms: A Case of Taiwan Hsinchu Science Park

Yu-Ning Hu; National United University, Taiwan
Chih-Lung Chou; Hwa-Hsia Institute of Technology, Taiwan
Chia-Liang Hung; National Chi-Nan University, Taiwan

It is widely believed that competitiveness of a nation or a region stems from industry cluster. In this study, 75 Taiwanese IC design firms were surveyed to assess the differences due to clustering phenomenon. The finding is that IC design firms inside and outside Hsinchu Science Park perceive small environment differences, especially in the aspect of human resources. Because human resources are the basis for developing sustainable competitiveness, this research from survey and statistical analysis implies that industry cluster may not be the only or best industrial policy to consider.

MB-09.2 [A] The Study on Identifying the Required Competences in the Emerging Fabless IC Design Service Industry

Ya-Ti Lin; National Chiao Tung University, Taiwan
Hsiao-Cheng Yu; National Chiao Tung University, Taiwan

The semiconductor manufacturing model has evolved in the 1990s from entirely owned by integrated device manufacturers (IDMs) to a specialized collaboration value chain composed of different key sub-industries. Continuous evolvement has driven the integrated circuit (IC) design service in becoming a critical and emerging sub-industry to the semiconductor value chain since the year 2000. IC design service companies are important enablers and mediators to integrate the IC design and manufacturing process in the semiconductor value chain. However, there is a lack of business or management related research due to the fact that the IC design service industry is still in the emerging stage. Therefore, it is difficult to understand what competences an IC design service needs to possess in order to become successful. This research is composed of literature review and in-depth interviews with the focus group formed by the management members of the selected cases. Seven competences have been defined throughout the research as follows: IP design capability, integrated IP turnkey solution, customized design capability, integrated supply chain services for turnkey IC production, comprehensive design capability for various applications, effective reduction of new product development cost for customers, and integrated streamline manufacturing technologies for IC production. The contribution of this paper is to explore the essential competences of this emerging industry and to serve as a foundation for further extended research.

MB-09.3 [R] The Study of Development of Product Strategy by Patent Analysis: A Case Study of Semiconductor Equipment Component

Chao-Hsin Chen; Chen Tin Idustrial Ltd, Taiwan
Yun Ken; National Yunlin University of Science & Technology, Taiwan
Shian-Hung Shiu; Doctoral student, National Yun-Lin University , Taiwan
Tao Huang; National Yunlin University of Science & Technology, Taiwan
Wen-Cheng Wang; Hwa Hsia Institute of Technology, Taiwan
Ya-Yueh Shih; National Chiayi University, Taiwan

Established intellectual property can defend against negative effects and advocate positive effects, and for Taiwans majority of small- and medium-sized and newly created enterprises, patent analysis is essential for technical competition and technology trend analyses. Past patent analysis focused on the area of technology research analysis; however, this research takes semiconductor equipment components as an example, aimed at both a discussion of technology and a market analysis viewpoint of industrial structures, and finally, forming suggestions for product strategy development that provide industrial decision-makers reference for important managerial decisions. This research forms a feasible product strategy, from the viewpoint of an industrial structure, of market analysis and patent management analysis. Regarding market analysis, from the electronics industry viewpoint, of the upstream to downstream semiconductor manufacturing market of semiconductor wafer equipment and semiconductor back-end equipment as the main body of analyzes of past markets and forecasts future developments. Patent management analysis involves diverse graphs and statistical results in patent quantity, according to nationality, company, etc. This type of information will assist a company to understand, present a market patent layout, compete for information, and gather technology knowledge. Finally, the conformity of the market analysis and the patent management analysis form an industrial product strategy.

MB-09.4 [A] The Role of Product Development Technology Group in the Global Semiconductor Foundry Business Model

Samar K Saha; University of Colorado at Colorado Springs, United States

This paper describes the major integrated circuit (IC) product development technologies (PDT) and the role of the PDT group (PDTG) for enabling transition of semiconductor foundries from pure-play, manufacturing only to complete solutions provider like an integrated device manufacturer. In the microelectronics industry, a semiconductor foundry provides cost-effective integrated circuit manufacturing technology and wafer fabrication services to fabless IC design companies. However, besides contracting wafer fabrication, fabless companies also require new product development (NPD) solutions including design collaboration, technology customization, device models, and customer owned computer-aided-design tooling flow. Therefore, the role of PDTG is extremely critical in providing the required NPD services to customers. In this paper, the organization, functionality, and the role of PDTG in the transition of semiconductor foundries from wafer fabrication-only services to complete solutions provider are discussed.

MD-01 PLENARY - 2

DATE: MONDAY, 7/19/2010
TIME: 13:00 - 14:30
ROOM: BALLROOM A
CHAIR: KWAN SITATHANI; NECTEC, THAILAND

SESSIONS

MD-01.1 Managing Technology and Innovation of SCG: A Case Study

Kan Trakulhoon; Siam Cement Group (SCG), Thailand

SCG strives to become an innovative organization, generating pioneering, environmentally friendly products referred to as high value-added products, incrementing value for our customers and stakeholders, maintaining regional market leadership, and sustaining a strong presence in all communities where SCG operates. To ensure value creation, SCG warrants over 1 Billion Baht annually on its R&D budget to support R&D activities, which include conducting campaigns such as SCGs Power of Innovation Awards to advocate creativity and innovation among staff, applying intellectual property management on novel findings and solutions, and collaborating with government entities to promote Thailand as a regional trading hub. These formations help secure SCG as one of ASEANs (Association of Southeast Asian Nations) market leaders.

MD-01.2 Innovating the Invisible: Dominant Innovation for Product and Service Systems in a Changing World

Jay Lee; University of Cincinnati, United States

Innovation is not an option for todays industry. For the past decade, globalization and transformation of the flat-world economy have produced vast new challenges for industry. Innovation is not just about new product development; it also refers to the creation of new value-added services to transform better productivity and business performance. As the practice of product design has expanded, both in economic and social impact and in technological complexity, so have the demands upon innovative service systems. This presentation introduces a dominant innovation system and tools for products and services in a changing competitive global market. Examples will be given to illustrate how to formulate gaps between a product and customers invisible needs using an innovation matrix and application space mapping tools. In addition, examples will be used to illustrate how world-class companies and small- to medium-size companies can transform themselves to become innovative leaders.

ME-01 R&D Management - 1
Monday, 7/19/2010, 15:00 - 16:30
Room: Ballroom A
Chair(s) Jungwon Lee; Science & Technology Policy Institute (STEPI)

ME-01.1 [A] How to Manage and Utilize the Information from R&D Evaluation?

Jungwon Lee; Science & Technology Policy Institute (STEPI), Korea, South

The management and utilization of information from the R&D evaluation is an important construct in performance-based R&D management systems. This paper analyzes information from the evaluation systems of government R&D activities and suggests policy implications that could make more effective management and utilization of evaluation information. For the effective utilization of evaluation information, active linkage of R&D management systems and sharing of information among agencies are necessary. The linkage model of R&D evaluation systems can be designed by following procedures: 1) investigation of information from evaluation systems, 2) identification of information needs, 3) making evaluation data flow diagram, 4) conceptual design of the linkage model, 5) operational design of the linkage model. The information from R&D evaluation should be open to the interest groups as much as possible for transparency and fairness. For the effective linkage of R&D evaluation systems, standardization of terminology of evaluation criteria and classification codes of R&D projects are suggested. The inter-relation among expert databases of each agency is one of the most practical examples of the linkage model in the evaluation systems. The author provides some recommendations for more integrative evaluation systems at the national level.

ME-01.2 [A] Application of Fuzzy Sets in Analysis of National R&D Program

Yoon Been Lee; KISTEP, Korea, South
Jiho Hwang; KISTEP, Korea, South

A feasibility analysis of national R&D programs has applied the analytic hierarchy process (AHP) as a decision-making tool. In order to reflect the characteristics of R&D programs in the analysis, research teams built a decision structure, which consists of three elements: technology, policy, and economic analysis. Although the decision structure is effective in synthetic analysis, there is a question about whether discrete measurement of criteria undermines the justification of results from feasibility analysis with AHP. In this study, we reviewed and applied the fuzzy AHP, which is suggested as an alternative tool to classical AHP, and then built a model with fuzzy sets incorporating discussion and questionnaires of qualified professionals who have participated in evaluation of national R&D program or feasibility analysis.

ME-01.3 [R] An Assessment of Implementation of Municipality Supported Research Projects

Halil ibrahim Cobuloglu; University of Yalova, Turkey
Cengiz Güngör; University of Yalova, Turkey
Hasan Hüseyin Turan; University of Yalova, Turkey
Hikmet Erbıyık; University of Yalova, Turkey
Köksal Tandıroğlu; İstanbul Metropolitan Municipality, Turkey

My Project Istanbul is the name of the research fund given by Istanbul Metropolitan Municipality for research projects directed to municipality related subjects and carried out by about 22 universities located in Istanbul. Due to restricted funds, municipality has to be careful about supporting the right projects. In this paper, we evaluate the success of completed projects by the help of conducted surveys. In the proposed assessment tool, gathered surveys are analyzed by utilizing factor analysis. Moreover, a two-dimensional R&D project portfolio matrix is constructed, and each completed projects is placed into this matrix in order to classify its success. Finally, we suggest a better procedure to select the most appropriate project among candidate projects for Istanbul Metropolitan Municipality.

ME-02 Competitiveness - 1
Monday, 7/19/2010, 15:00 - 16:30
Room: Ballroom B
Chair(s) Saku J Makinen; Tampere University of Technology

ME-02.1 [R] Product Performance in Eras of Varying Technology Based Competition

Saku J Makinen; Tampere University of Technology, Finland
Ozgur Dedehayir; Tampere University of Technology, Finland

Technological imbalances that emerge from the evolution of technological systems act as focusing devices, and firms subsequently engage in closing the imbalances with product development efforts resulting in technology based competition. In this paper we empirically study the measurement of technological imbalances and in turn derive a framework that distinguishes between differing dynamics of technology based competition. We then illustrate the application of this framework in the empirical study of the PC technological system, focusing specifically on its function as a computer gaming platform. In our empirical illustration we study the co-evolutionary technological imbalance formation of the PC game software in relation to the CPU and GPU hardware sub-systems, respectively, between August 1995 and 2008. Our results show that the co-evolution of the PC game and hardware sub-systems progresses successively through eras marked by differing dynamic properties of technology based competition. We in turn explore the market performance of products that are first to introduce higher levels of technological performance with respect to these different eras of competition. We finally elaborate on managerial and theoretical implications of our developed framework as well as the empirical illustration.

ME-02.2 [R] Co-opetition of Cooperative and Competitive Relationship: A Network Analysis Approach

Yen-Seng Hao; National Chi Nan University, Taiwan
Hsin-Yu Shih; National Chi Nan University, Taiwan
Hung-Chun Huang; National Chi Nan University , Taiwan

Ling-Li Lin; National Chi Nan University , Taiwan

This study investigates how firms identify cooperators and competitors in the industry. The traditional approach was a good contribution, but it only used the dyadic view, which is unable to find triadic or even multi information. Thus, we developed a new method through the observation of 20 firms that own more than 95 percent of RFID patents in the United States. Findings supported the concept of cluster and block modeling which shows that the complementariness of competition and cooperation would appear at the same time. This article extends co-opetition research from qualitative research to quantitative research. Finally, this study explores the hidden information of patent citation and offers more messages.

ME-02.3 [A] Leveraging Technology for Lowering Access Barriers: The Case of Moser Baer in the Indian Film Industry

Niraj Mankad; Indian Institute of Technology Bombay, India
Shishir K Jha; Indian Institute of Technology Bombay, India

Access to cultural products across large sections of Indian society has traditionally been restricted as a result of relatively high monopoly prices and the exercise of strict copyright controls. Although this flaw in the conventional delivery model of the entertainment industry has led to limited availability, it has also created an opportunity for new emerging firms such as Moser Baer. Moser Baer, an Indian multinational and a leader in storage media technologies, made a surprising move by entering the entertainment industry and has since contributed to a considerable restructuring of the industry's existing landscape. It has, through its proprietary and patented technology, significantly contributed to the radical lowering of storage media costs. The firm has subsequently licensed-in several hundred films, burnt and sold the contents on its inexpensive DVDs. By providing movie DVDs at a price that is the lowest in the world and distributing them to the remotest corner of the country using a multi-tiered distribution network, Moser Baer has almost single-handedly revolutionized access. We would like to examine through a case study how Moser Baer is able to create a unique strategy using technology, creative licensing strategies and an FMCG-like distribution channel as a differentiator to revolutionize access to films within India.

ME-02.4 [A] Evaluation Methodology of S&T Innovation Capability

SeungRyong Lee; KISTEP, Korea, South
ChiYong Kim; KISTEP, Korea, South
YongHee Kim; KISTEP, Korea, South

As science and technology (S&T) has become a source of global competitiveness in the knowledge-based economy, the level of S&T capacity determines a nations competitive power. Countries, therefore, have been enhancing investment and political support to strengthen S&T capacity. Most of all, accurate analysis and assessment of the level of nations S&T ability of nations are needed to make effective policy measures. On the basis of the framework of the national innovation system (NIS), this paper suggests indexes to cover the entire cycle of S&T innovation. And it creates models to measure S&T capacity comprehensively, and tries to appraise 30 OECD members. Although IMD and WEF competitiveness reports, which are regarding S&T as just one of components of a nations competitiveness, include S&T domains, these survey are insufficient to measure a nation's S&T capability synthetically and systematically.

ME-03 Collaborations for Technology Management - 1

Monday, 7/19/2010, 15:00 - 16:30
Room: Similan 1
Chair(s) Hiromi Saito; National Graduate Institute for Policy Studies

ME-03.1 [R] What Kinds of Firms Collaborate with Universities and Public Research Institutes?

Hiromi Saito; National Graduate Institute for Policy Studies, Japan

Recently, it is said that R&D strategy of firms has changed from independent R&D to introducing outsourceopen innovation. Then, it is universities and public research institutes that attract attention as providers of outsourcing. They have substitute roles for R&D on firms because they carry out basic research with high risk that private firms cannot. However, it is not necessarily certain what firms collaborate with universities and public research institutes based on the evidence. In this paper, we empirically analyze determinants on collaboration with universities and public research institutes on firms side using probit model. We particularly focus on technological fields of research outcomes produced by universities and public institutes. We obtained data by original questionnaire survey that was delegated to an investigation company. In this paper, we used about 3,800 firms (response rate, 18 percent). On the whole, we found significant relationships between types of collaborations and technological fields in which research outcomes by universities and public research institutes firms use. This finding would also be important for managers of technology because this suggests that firms need to form collaborations with universities and public research institutes according to the technological areas that make their business effective.

ME-03.2 [R] International U-I Collaboration: A Bridge Across Open Innovation, R&D Globalization and National Innovation System

Jun Jin; Zhejiang University, China
Shanchao Wu; Zhejiang University, China
Jin Chen; Zhejiang University, China

With the economics and society globalization, international university-industry collaboration (which happens cross boundaries) is emerging, which is distinguished from the university networks and from the usual university-industry collaboration in one country. Integrating open innovation, R&D globalization, national innovation system, and university-industry knowledge transfer, the study examines the issues and functions of international university-industry collaboration. The Philips Brainbridge program and ISAW international cooperation are used as cases to explore two important types of international university-industry collaboration in China. Through the international university-industry collaboration, foreign universities contribute to the development of innovative capabilities of industries in China, while the foreign companies could play roles in the national innovation system building of the host country. This research enriches the theories of open innovation and R&D globalization from the industrial field to academics. The research suggests that the international university-industry collaboration could be used as a bridge to connect the strategies of open innovation and R&D globalization with the improvement of the national innovation system.

ME-03.3 [A] Research on the Knowledge Creation Process of the University-Industry Collaboration: A Case Study of Chinese Household Appliances Manufacturing Industry

Wei Yao; Zhejiang University, China
Yaqi Si; Zhejiang University, China
Jin Chen; Zhejiang University, China
Jue Hu; Zhejiang University of Technology, China

This paper describes the results of an exploratory case study illustrating how knowledge is transformed and created during the process of U-I collaboration in China. To describe the knowledge transformation tendency, a theoretical framework is developed by reference to the Information Space which of Boisot (1995). Seven stages of knowledge co-creation in U-I collaboration are identified: demand codification, knowledge gain, knowledge digestion, knowledge sharing, knowledge propagation, knowledge spillover and knowledge degeneration. Based on it the GDSP knowledge creation theory, which enriches and advances the typical SECI knowledge creation theory in some aspects, is proposed. Finally, some of the implications for academic and managerial practice are considered.

ME-04 Technology Forecasting - 2

Monday, 7/19/2010, 15:00 - 16:30
Room: Similan 2
Chair(s) Jamie Rogers; University of Texas - Arlington

ME-04.1 [R] Methodology to Forecast Product Returns for the Consumer Electronics Industry

Amit Potdar; University of Texas at Arlington, United States

Jamie Rogers; University of Texas at Arlington, United States

One important aspect of reverse logistics is to have a correct and timely estimation of return flow of material. Improved forecast accuracy can lead to a better decision making in strategic, tactical and operational areas of the organization. Very little research has been done about the forecasting aspect of reverse logistics. For higher forecast accuracy, a more robust method is required. The methodology presented here is based on the return reason codes (RC). The incoming returns are split into different categories using return reason codes. These reason codes are further analyzed to forecast returns. The computation part of this model uses a combination of two approaches, namely extreme point approach and central tendency approach. Both the approaches are used separately for separate types of reason codes and then results are added together. The extreme point approach is based upon data envelopment analysis (DEA) as a first step combined with a linear regression while the central tendency approach uses a moving average. For certain type of returns, DEA evaluates relative ranks of the products using single input and multiple outputs. Once this is completed, linear regression defines a correlation between relative rank (predictor variable) and return quantity (response variable). For the remaining type of returns we use a moving average of percent returns to estimate the central tendency. Thus, by combining two approaches for different types of return reason codes, we have developed a model that can be used to forecast product returns for the consumer electronics industry.

ME-04.2 [R] Bibliometric Assessments of Network Formations by Keyword-based Vector Space Model

Hsin-Ning Su; Science and Technology Policy Research Center, Taiwan
Pei-Chun Lee; National ChengChi University, Taiwan
Te-Yi Chan; Science and Technology Policy Research Center, Taiwan

This study proposes an empirical way for determining probability of network tie formation between network actors. In social network analysis, it is a usually a problem that information for determining whether or not a network tie should be formed is missing for some network actors, and thus the network can only be partially constructed due to the unavailability of information. The methodology proposed in this study is based on network actors similarities calculations by vector space model to calculate how possible network ties can be formed. Also, a threshold value of similarity for deciding whether or not a network tie should be generated is suggested in this study. Four keyword-based research networks, with journal paper or research project as network actors, constructed previously are selected as the targets of this empirical study: 1) Technology Foresight Paper Network: 181 papers and 547 keywords, 2) Regional Innovation System Paper Network: 431 papers and 1165 keywords, 3) Global Sci-Tech Policy Paper Network: 548 papers and 1705 keywords, 4) Taiwans Sci-Tech Policy Project Network: 143 research projects and 213 keywords. The four empirical investigations allow a threshold value calculated by vector space model to be suggested for deciding the formation of network ties.

ME-04.3 [R] Integrated Methodologies for Mapping and Forecasting Science and Technology Trends: A case of Etching Technology

Feng-Shang Wu; National ChengChi University, Taiwan
Chun-Chi Shiu; National ChengChi University, Taiwan
Pei-Chun Lee; National ChengChi University, Taiwan
Hsin-Ning Su; Science and Technology Policy Research Center, Taiwan

This study proposes an integrated trend analysis methodology by applying bibliometric analysis and text mining on both scientific paper and patent database. The bibliometric analysis is investigated in four different dimensions: publication growth, country/region, organization, and classification. However, the text mining is obtained by keyword analysis for different time periods and research field maps. The integrated method is applied to etching technology, which is a material processing technology particularly important for the semiconductor industry. On the basis of the results obtained in the practice of etching technology, six different relations among the proposed two publication databases (paper and patent) and two conventional trend forecasting methods (bibliometrics and text-mining) are systematically analyzed as a framework for depicting a desirable sci-tech trend analysis model: Bibliometric analysis should be investigated first, and then text-mining is subsequently applied to discover important research topics of selected fields. The importance of paper and patent should be equally treated for obtaining a complete result taking both theory and practice into consideration.

ME-05 Innovation Management - 2
Monday, 7/19/2010, 15:00 - 16:30
Room: Arcadia Hall 1
Chair(s) Frederick Betz; Portland State University

ME-05.1 [R] Analysis of the Familiarity and Mutual Dependency of Firms from the Perspective of SME CIN's Effectiveness

Yu-Lien Tai; Industrial Technology Research Institute, Taiwan
Junzo Watada; Waseda University, Japan
Hsiu Hsien Su; Industrial Technology Research Institute, Taiwan

The main objective of this study is to define the core attributes that influence the member firms of small and medium enterprise collaborative innovation networks (SME CINs) to join collaborative research and development (R&D) projects provided by the inter-firm networking of SMEs in technology-intensive clustering assistance (TICA) projects. We used social network analysis, resource dependence theory, and transaction cost analysis to select the attributes of firms and a rough sets approach to mine rules that explain whether firms join collaborative projects. Especially, this study utilized a rough sets model and identified the core attributes. The familiarity and connections that members share with one another are found to be the core attributes of members in SME CINs that push them to join collaborative innovation activities. Further, the existence of relationships among SMEs is more important than the strength of the relationships themselves.

ME-05.2 [R] The Effect of Affiliation Network on Technological Innovation

Calvin S Weng; Takming University of Science and Technology, Taiwan
Wan-Yu Chen; Transworld Institute of Technology, Taiwan
Te-Wei Lo; National Yunlin University of Science & Technology, Taiwan

The purpose of this paper is to analyze the effect of affiliation network on creating innovative ideas and forming a technological position. We adopt the concept of an affiliated network and use the technique of social network analysis to investigate patent data from USPTO. From the results of analysis, we found some technological implication from affiliation network of technology.

ME-05.3 [R] Does Business Group Affiliation Make Firm Innovation Different? Evidence from Taiwan

Tsun-Jui Hsieh; Providence University, Taiwan
Yu-Ju Chen; Providence University, Taiwan
Wei-Li Wu; Ching Yun University, Taiwan

This paper investigates how business group affiliation affects firm innovation. Business groups have greater access than most stand-alone firms to the resources needed to trigger innovation in emerging economies. Business group affiliation provides firms with key necessary resources and facilitates affiliated firms to engage in higher-level innovative activities. However, unaffiliated firms tend to undertake relatively low order innovative projects because of their resource constraints. Such patterns of innovative activities vary from a firms group membership. Evidence from Taiwan presented in this paper suggests that affiliated firms generate greater innovative outputs than unaffiliated firms. The findings also suggest that affiliated firms generate a higher proportion of major innovation while unaffiliated firms produce more on incremental innovation. This study contributes to recent endeavors to understand the effects of business groups on firm innovation.

ME-05.4 [R] An Integrated Metric for R&D Innovation Measurement

Gyunghyun Choi; Hanyang University, Korea, South
Sung-Seok Ko; Konkuk University, Korea, South

Numerous studies have been conducted to develop measurement systems for R&D performance. However, most of them are focused on R&D, knowledge, and/or performance management; and also, each measure is partially and independently designed. In this research report, we present an integrated innovation metric which can measure all the innovation activities for R&D innovation. For this metric, we define the term R&D innovation as product and process innovation, and investigate the impact of innovation. We then propose four metric groups: R&D management capability, integration, openness, and R&D environment. Also, some key performance indicators are presented along with relevant success factors for each metric group. This metric is easy to use for management as well as consultants not only to lead firms successive innovation efforts but also to generate guidelines for tailored innovation strategies for each firm.

ME-06 Technology Adoption and Diffusion - 2
Monday, 7/19/2010, 15:00 - 16:30
Room: Arcadia Hall 2
Chair(s) Nazrul Islam; Tokyo Institute of Technology

ME-06.1 [R] Adopted Intention of Mobile Commerce from TAM Perspective: An Empirical Study of Real Estate Industry

Ya-Yueh Shih; National ChiaYi University, Taiwan
Chi-Yuan Chen; ChungHua University, Taiwan
Chih-Hung Wu; National Taichung University, Taiwan
Tao Huang; National Yunlin University of Science & Technology, Taiwan
Shian-Hung Shiu; National Yunlin University of Science & Technology, Taiwan

Mobile commerce systems create a new mobile business model and change e-commerce paradigms, having an especially significant effect on the medical and insurance industries. Furthermore, the real estate industry is increasing in the booming market, but tends to become overheated. Thus, some innovative techniques (such as mobile commerce) were adopted by estate agents to enhance their competitive advantage. This study examines the usage behavior of a sample of users of the new technology of m-commerce using a technology acceptance model (TAM). In fact, technology acceptance model (TAM) is a well-known theory regarding the adoption of information technology (IT). Furthermore, this paper incorporates an additional behavioral construct, tool experience, to improve the predictive value of the original TAM model, named revised TAM. Additionally, the structural equation model (SEM) is used to verify the causal relationships between variables. Analytical results confirm that TAM is appropriate for explaining the use of m-commerce for the insurance industry.

ME-06.2 [R] A Conceptual Framework on the Adoption of New Service Development Tools and Techniques in Service Firms

Dayu Jin; National University of Singapore, Singapore
Kah Hin Chai; National University of Singapore, Singapore
Kay Chuan Tan; National University of Singapore, Singapore

Over the past few years, various new service development tools and techniques (NSD tools) have been developed. However, little is known regarding the factors influencing their adoption. The objective of this paper is to build a theoretical framework to explain the determinants of adopting NSD tools in service firms. We do so by using the theory of planned behavior (TPB) to explain the adoption behavior. TPB has been shown to have substantial predictive power. We applied it at the firm level and decomposed it to provide a clear picture of the influencing factors. Attitudinal beliefs are broken down into perceived usefulness and perceived ease of use, according to the technology acceptance model (TAM). Institutional theory is adapted to break subjective norm beliefs into supplier coercive pressure, competitive pressure and customer coercive pressure. Perceived behavior control beliefs are decomposed to make clear the impact of compatibility of NSD tools and resource commitment.

ME-06.3 [R] Relationship between Information and Communication Technology (ICT) Adoption and Hotel Productivity: An Empirical Study of the Hotels in Phuket, Thailand

Sirawit Sirirak; Asian Institute of Technology, Thailand
Nazrul Islam; Asian Institute of Technology, Thailand

The tourism industry in Thailand has been growing rapidly and generating considerable income for the country during the last decade. Many hotels have faced severe competition, so they have adopted information and communication technologies (ICT) to increase their productivity, one of the hotel performance indicators. This paper investigates the relationship between ICT adoption and hotel productivity. The level of ICT adoption was measured by three elements: ({ i) ICT component availability; (ii) ICT component integration; and (iii) intensity of ICT component usage. Hotel productivity comprising operational and customer productivities was calculated by using data envelopment analysis (DEA). Multivariate analysis was used to assess the relationship between levels of ICT adoption and hotel productivity. Data was collected through a questionnaire survey of both hotel managers and customers from three classes of hotels in Phuket, Thailand. Results reveal that in some categories of hotel, ICT adoptions have a positive relationship with either operational / customer productivity. It suggests that the hotels should adopt ICT selectively depending on their category. Further, the intensity of ICT use has more impact than simply having the number of ICT, for increased productivity.

ME-06.4 [R] A Study on the Success Potential of Multiple Mobile Payment Technologies

Mary Mathew; Indian Institute of Science, India
N Balakrishnan; Indian Institute of Science, India
S Pratheeba; Indian Institute of Science, India

Payment systems all over the world have grown into a complicated web of solutions. This is more challenging in the case of mobile based payment systems. Mobile based payment systems are many and consist of different technologies providing different services. The diffusion of these various technologies in a market is uncertain. Diffusion theorists, for example, Rogers and Davis, suggest how innovation is accepted in markets. In the case of electronic payment systems, the tale of Mondex vs. Octopus throws interesting insights on diffusion. Our paper attempts to understand the success potential of various mobile payment technologies. We illustrate what we describe as technology breadth in mobile payment systems using data from payment systems all over the world (n=62). Our data shows an unexpected superiority of SMS technology over other technologies like NFC, WAP and others. We also used a Delphi based survey (n=5) with experts to address the possibility that SMS will gain superiority in market diffusion. The economic conditions of a country, particularly in developing countries, the services availed and characteristics of the user (for example number of un-banked users in large populated countries), may put SMS in the forefront. This may be true more for micro payments using the mobile.

ME-07 Technology Management in Health Industry - 1
Monday, 7/19/2010, 15:00 - 16:30
Room: Lagoon Hall 1
Chair(s) Supiya Charoensiriwath; NECTEC

ME-07.1 [A] SizeThailand e-Health: A Personalised Health Monitoring and Diagnosis System Using 3D Body Scanning Technology

Supiya Charoensiriwath; NECTEC, Thailand

Obesity has now become a national health problem for many countries throughout the world. It is thought to be the root of many other medical conditions such as high blood pressure, heart disease and diabetes. Thailand is one of the countries affected by this so-called obesity epidemic, having seen a dramatic increase in obesity in the past decade. According to the results published earlier this year by the Thai Sizing Survey (SizeThailand), around 35 percent of the Thai population is either overweight or obese. This number was increased from 27 percent in 2003 when the Department of Health conducted its diet and nutrition survey. This paper describes a personalized health monitoring and diagnosis system developed by the National Electronics and Computer Technology Center (NECTEC) as part of

a national project called SizeThailand e-Health. The system allows the users to regularly monitor their body shape and health online. Periodically, the data are sent to doctors and nutritionists to provide a personalized feedback on the status of health for each user. This way, doctors can also diagnose people with obesity and give them guidance or recommendations on how to control their weight accordingly. Moreover, the data collected through the system can be further analyzed to find associations between body shape and health.

ME-07.2 [A] A Business Process Improvement Study in a Specialized North American Hospital

Amar Ramudhin; École de Technologie Supérieure, Canada
Akif A Bulgak; Concordia University, Canada
John Fowler; John G Fowler Consulting Inc., Canada

This paper describes a study of the registration and admission processes of patients in a specialized North American hospital. The methodology employed is comprised of extensive discussions with the hospital administration as well as observations of the current processes, detailed modeling and validation of the processes using specialized medical business process improvement software, medBPM, identification of the sources of the current problematical issues, and recommendations for potential improvements. Various aspects of the registration and admission processes were analyzed and/or compared in detail such as the centralized versus decentralized registration systems, coordination of planning and scheduling of activities and their execution and the reduction of non-value added activities. The use of the specialized software, medBPM, has proven itself to be a useful business process improvement tool in this study. Following the analysis, recommendations have been made to modify processes and procedures that should result in improved patient satisfaction, streamlining of the workflow and reduction of non-value added work. The implementation stage will be taking place at a later time.

ME-07.3 [R] Information Technology Acceptance in Healthcare Service: The Study of Electronic Medical Record (EMR) in Thailand

Vichita Vathanophas; Mahidol University, Thailand
Tullawat Pacharapha; Mahidol University, Thailand

The explosive growth in technology usage has put growing pressure on organizations to serve customers electronically. Healthcare service, as one of the data intensive industries, tries to serve their patients with excellent service in a timely manner when the data volume is growing faster than organizational infrastructure development. Because the hospital information system called Electronic Medical Record (EMR) is a powerful tool, and provides a multitude of benefits, many hospitals are today considering accepting and adopting this technology to provide medical information and healthcare services in a better way. This study will extend the applicability of the technology acceptance model (TAM) to test user acceptance of EMR in the hospital context in Thailand. The study aims to investigate EMR characteristics which affect Electronic Medical Record (EMR) acceptance in the healthcare professions belief perspective in hospital. This EMR acceptance measurement will help the organization forecast how the healthcare professions perception of EMR usage will affect and support the organizational development. The result can be used as a guideline for EMR implementation that may lead to a successful EMR initiative in Thailand.

ME-08 Technology Transfer - 1
Monday, 7/19/2010, 15:00 - 16:30
Room: Lagoon Hall 2
Chair(s) Erik J de Bruijn; University of Twente

ME-08.1 [R] Private-Sector-Driven International Technology Transfer with the Initiative of a Recipient Country: The Case of Technology Promotion Association (Thailand-Japan)

Masayuki Kondo; Yokohama National University, Japan

Although many papers can be found on international technology transfer from a parent company to its sister companies or between companies, this paper analyzes the case of private-sector-driven international transfer of general production technology from Japan to Thailand through a non-government organization (NGO) established by former Thai students who studied in Japan. This international technology transfer scheme has been successful along with a massive foreign direct investment in the manufacturing industry from Japan to Thailand and with a small financial support from the Japanese government. As a result, this NGO has established a technical university recently. The paper has found that the success factors are that the demand for Japans production technologies increased as foreign direct investment from Japan increased in Thailand, that Japanese companies and experts were willing to transfer technologies to Thai companies and Thai-Japanese companies, that the management board members of the NGO were willing to contribute to the country to solve the problems of the companies they worked for and to enhance the social evaluation of the people who studied in Japan, and that the NGO had to compete with other technology service providers in the private sector.

ME-08.2 [R] Payment Schemes in Learning-Related International Technology Licensing Contracts

Peter J Sher; National Chi Nan University, Taiwan
Hsin-Yu Shih; National Chi Nan University, Taiwan
Beryl L Kuo; National Chi Nan University, Taiwan
Chien-Hsin Lin; Yu Da University, Taiwan
Yi-Chen Lu; National Taiwan University, Taiwan

This study explores the effect of knowledge stickiness and recipient learning on payment modes of foreign technology licensing in the context of newly industrializing economies. We apply the transaction cost economics and knowledge-based perspective to examine the payment modes of international license-in. As payment modes are the outcome of negotiation, we hypothesize that the choice of actual and expected payment modes are associated with knowledge tacitness, resource dependence and recipient learning capability. Based on a survey of 84 Taiwanese firms in ICT industries, we found transaction cost perspective and resource-based of knowledge view provide useful insights into the choice of licensing-in payment modes. The results suggest that the actual and expected payment modes of more proportional royalty payments are negatively associated with tacitness but positively associated with resource dependence and recipient learning. Further implications and suggestions are offered in this paper.

ME-08.3 [R] University Start-ups and the Regional Economy

Harm-Jan Steenhuis; Eastern Washington University, United States
Erik J de Bruijn; University of Twente, Netherlands

Certain regions in the world are economically very successful. They are connected with prominent universities. Examples are the Route 128 region near Boston, which is connected with MIT, and the Goteborg area in Sweden, which is related to Chalmers University of Technology. In this knowledge era the issue is how to best use the knowledge that is created by universities to enhance economic development. This paper focuses on the role of universities for regional development and in particular university start-ups. Based on a literature review, this paper is concerned with three questions. First, what is the economic effect of a university on the region? Second, what are differences of university start-ups compared to other start-ups? Third, what is the effect of university start-up companies on the region? It was found that universities have several different economic effects on a region, including direct knowledge effects such as start-ups. Technology based start-ups have a disproportionate effect on the economy. Lastly, although success stories exist about the regional impact of, for example, MIT and Stanford, there are two issues: what is included in their calculations, and distributions of success are highly skewed. Based on these findings, suggestions for further research are provided.

ME-08.4 [A] Identify the Potential of Technology Transfer through International Trade between Iran and Azerbaijan

Mousa Rezvani Chaman Zamin; Islamic Azad University Astara Branch, Iran
Jamshied Salehi Sadaghiani; Allame Tabatabae University, Iran

Economics and Business Sciences theorists today believe that international trade tools

of the field instrument in the development of nations. Sustainable results and analysis of important international trade and global trade is technology transfer. The perspectives of technology transfer hardware and software development role in the country, Technology transfer discussion must inevitably subject to three types of technology transfer is accurate. The first topic is the technology life cycle. The second topic is the technology needs of the buyer and seller usually win - win final analysis are the subject of technology is appropriate. In this article, researcher to the role of knowledge based development potential that the technology transfer between Iran and Azerbaijan through trade between two countries is done. In this research, the researcher intends to hide knowledge resulting in trade between Iran and Azerbaijan as a potential development at least raised to regional and finally to determine what areas of the better business done between the two countries in order to technology transfer and knowledge management technologies transferred technology acceleration in the growth and development of the country is.

MF-01 R&D Management - 2
Monday, 7/19/2010, 17:00 - 18:30
Room: Ballroom A
Chair(s) Chao-Chih Hsueh; NPUST

MF-01.1 [R] Behavioural Change as Antecedent to Output Improvement of Recipient Firms in Government-Sponsored R&D Programme

Chao-Chih Hsueh; NPUST, Taiwan
Fang-Ming Hsu; National Dong Hwa University, Taiwan

This study adopts a broader behavioural additionality framework to evaluate public R&D support programs and examine the relationships among input additionality, behavioural additionality, output additionality and firm characteristics. Based on a sample of 127 government-sponsored R&D programs in Taiwan (1996-2005), this investigation presents empirical evidence for various additionality stimulated by public R&D programs. The analytical results demonstrate that output additionality is strongly influenced by behavioral additionality. The study findings suggest that the government should not only measure output additionality but should also stress the behavioral additionality of recipient firms to recognize potential performance after adjusting their R&D strategy and business operations.

MF-01.2 [R] R&D Success Factors and Intensity for Small- and Medium-sized Enterprises in Korea

Daemyeong Cho; Hanyang University, Korea, South
Gyunghyun Choi; Hanyang University, Korea, South

Innovation is almost a necessity for business nowadays for being competitive. As a practical activity for technical innovation, the significance of R&D is on the rise more and more in either large or small- and medium-sized enterprises. Especially for small- and medium-sized enterprise (SMEs), R&D is considered as a main factor for innovation and sometimes is considered as a key factor for their survival. In this paper, we investigate some success factors for SMEs R&D and analyze their relative intensity on successive order base. Also, we show the interrelationship between the intensity and both company size and company age.

MF-01.3 [R] An Empirical Study of Board Education's Distribution and R&D Expenditure from Listed Manufacturing Firms in China

Qiang He; University of Shanghai for Scinece and Technology , China
Song Chen; Tongji University, China
Jian Zhang; Tongji University, China

With the data of 623 listed manufacturing firms in China, this paper investigates the relationship between board educations distribution and R&D expenditure. The result shows that board educations distribution is positive to R&D expenditure and that the higher the proportion of Ph.D. directors, the greater R&D expenditure. The impact of board education and its distribution on R&D expenditure in listed manufacturing firms of capital and knowledge-intensive industries, or in the east China regions,is stronger than the impact in firms, which pertain to labor-intensive industries or central and western regions in China. Board education and its distribution is not the major determinant of R&D expenditure of listed manufacturing firms in China.

MF-01.4 [A] Comparison of Influencing Factors of R&D Personnel Pay Satisfaction in Different Organizations

Haiyan Huang; Tongji University , China
Song Chen; Tongji University, China
Qian-wen Li; Nanjing Audit University, China

Based on the differences of ownership and operations and management systems in private and state-owned research institutions, this paper uses the empirical study method to compare influencing factors of R&D personnel pay satisfaction in different organizations. This study concludes that both of them got higher scores in the reasonableness of the income distribution system, the competitiveness of the remuneration system, benefits satisfaction and senior management's emphasis on R&D personnel. Both of them got lower scores in bonus distribution system of R&D personnel, income distribution system of R&D personnel and paid with the return of the reciprocity. There are significant differences in pay equity and non-economic pay between private and state-owned research institutions. The private institutions got higher scores than state-owned research institutions did. During the latest 30 years, scholars from home and abroad have already conducted much research on pay satisfaction theoretically and empirically. Most focus on pay satisfaction and its influencing factors, while there is very little research on influencing factors of pay satisfaction of similar personnel among organizations from different industries. Thus, this paper empirically analyzes influencing factors of pay satisfaction of R&D personnel between enterprises and scientific institutes in order to supply organizations of different industries with references.

MF-02 Science and Technology Policy - 1
Monday, 7/19/2010, 17:00 - 18:30
Room: Ballroom B
Chair(s) Hsin-Ning Su; Science and Technology Policy Research Center

MF-02.1 [R] Network Perspective of Science and Technology Policy Research Community in Taiwan

Hsin-Ning Su; Science and Technology Policy Research Center, Taiwan
Pei-Chun Lee; National ChengChi University, Taiwan

This study proposes a way of mapping the sci-tech policy research community by quantitatively analyzing sci-tech policy research projects funded by Taiwan government in the last 30 years. Taiwans sci-tech policy research networks composed by research community and knowledge distribution are quantitatively investigated by the use of network theory, and Taiwans sci-tech policy research map is created to obtain a two-dimensional visualization. The 3-dimensional networks and two-dimensional knowledge maps on the basis of Taiwans sci-tech policy research projects can be depicted differently by choosing different information as network actor, e.g. institute, project investigator or keyword, to reflect sci-tech policy research structures in micro-, meso-, and macro-levels, respectively. Sci-tech policy research projects are retrieved from the Government Research Bulletin (GRB) database, which archives research projects sponsored by Taiwan government. A total of 143 projects are retrieved in this study, and most of the research projects (59 percent) belong to the field of management, economics, and other (social). It can be observed that more sci-tech policy research projects in the field of technology management have been funded, and also the coverage of the field has increased since 2000. This indicates not only the emergence but also the interdisciplinary phenomenon of sci-tech policy research in Taiwan.

MF-02.2 [R] Reducing the Digital Divide of the Electronic Government of the 921 Reconstruction Areas in Taiwan

I-Mei Huang; National Yun-Lin Tech., Taiwan
Kwoting Fang; National Yun-Lin Tech., Taiwan

With great efforts over the past two decades, Taiwan has become one of leading countries in E-government practice. People have benefited from the efficiency of E-government services and Taiwan government will develop the next stage E-government, which is integrated, innovative, real time, interactive, and personalized, to establish a virtually trusted

society that connects each citizen via the Internet. At 1:47 a.m. on September 21, 1999, a massive earthquake measuring 7.3 on the Richter scale struck central Taiwan. This earthquake was a terrible disaster that caused tragic loss of life, severe property damage, and a sharp decline in living standards and the regional prosperity. The earthquakes of the last decade also brought to light the importance of earthquake disaster management (EDM) operations. As a result, there is an urgent call for applying digital services, broadening geographical service scope, enriching service options, and lowering costs for the reconstruction areas. This study employed the analytic hierarchy process (AHP) to analyze the Taiwan governments supply and demand of the information services in the reconstruction areas to heed the call for reducing uneven opportunities on availability of information and telecommunication technology.

MF-02.3 [R] A Study of Building Tax Knowledge-Based System: An Ontological Orientation using Cases under the National Tax Administration of Central Taiwan Province, Ministry of Finance

ChengTao Lee; National Yunlin University of Science & Technology, Taiwan
I-Mei Huang; Central Taiwan Science Park, Taiwan
Kwoting Fang; National Yunlin University of Science & Technology, Taiwan

Ontology methods, construction of the repository is divided into knowledge acquisition and knowledge representation. If you want to break through the limitations of information retrieval. Should get the computer to have the ability of automatic query, understand and information retrieval. Can first establish a common vocabulary used in the tax area. Assisted by experts in the field, giving the corresponding relationship between terms, and computer processing to these terms by the reaction of action (rules). To achieve computer "automatic" processing capacity. Therefore, how to build domain knowledge base for the subject of this paper to explore. The method of ontology development for the National Science Council of the technologies. "National Digital Archieves Program (NDAP)". Application in the professional field of knowledge, is the first step in the development of ontology approach. And a can be used in all areas of ontology, knowledge by the knowledge engineer to convert the ontology. But to accomplish this function, standardization of ontology is very important. This study will first explore the development of the tax status of the knowledge base. Second, how to use the ontology to build the tax knowledge base.

MF-02.4 [R] Evolution of the Open Industrial Innovation Policy: The Taiwanese Experience

Chiung-Wen Hsu; Feng Chia University, Taiwan

In the early 1970s, the Taiwanese government recognized that an island country such as Taiwan with scant natural resources and a limited domestic market needed to develop high-tech industries for sustained economic growth. However, for over a decade, it was thought that no existing industry in Taiwan could lead in the development of such industries. The government assisted in the initial development of domestic high-tech industries by supplying the fundamental expertise required. The government adopted the Technology Development Program (TDP) and contracted out projects to nonprofit research institutes, which then developed and transferred the applied industrial technologies to domestic industries to build new high-tech industries or upgrade current industrial technologies. To accelerate domestic technology, the TDP has also entrusted private corporations with R&D projects; further, it urges the academic sector to expand innovative research that would benefit the industries. The TDP works with the industrial, governmental, academic, and research sectors to facilitate development in industrial innovation. This program has evolved over the past three decades as the government responded to the requirement for industrial innovation. This paper provides a clear conceptual model of the TDPs industrial innovation policy. Three sub-models have evolved from this model: (1) the R&D and technology transfer model, (2) the R&D and cooperation model, and (3) the application-oriented and cooperation model.

MF-03 Collaborations for Technology Management - 3
Monday, 7/19/2010, 17:00 - 18:30
Room: Similan 1
Chair(s) Jari Soini; Tampere University of Technology

MF-03.1 [R] Product Knowledge Identification and Modeling for Virtual Collaboration Environment

Ishardita P Tama, University of New South Wales, Australia
Carl A Reidsema; University of New South Wales, Australia

Knowledge sharing is an essential factor to build virtual collaboration across organizations. Therefore, from the product design point of view, identifying required product knowledge is a very important thing. This product knowledge is closely related with product requirements and functions. However, the type of knowledge and information of a product, needed in virtual collaboration, is still not comprehensively explored and understood. The main purpose of this study is to develop a methodology to identify generic product knowledge and information to support knowledge sharing in a virtual collaboration environment. In this paper we propose a methodology for identification and modeling of product information, based on the function-behavior-structure (FBS) principle. The FBS principle was then translated into classification of product information. The classification can give a comprehensive view of a product. The flexibility of classification developed in this research makes it easier to be implemented across various different types of products. It also provides a better understanding about the products and their subcomponents. The identification of product information was followed by translation of it into a model. A model of generic product information was successfully built. Further research is planned towards developing a combined graphical and ontological product information model based on FBS principles.

MF-03.2 [R] Toward Adaptable Communication and Enhanced Collaboration in Global Crisis Management Using Process Modeling

Jari Soini; Tampere University of Technology, Finland
Gregor Polancic; University of Maribor, Slovenia

A disaster brings together a team of people often representing different organizations, resources, and roles. There are various parties involved and the situation requires close collaboration between different organizations and also the optimized, integrated use of management systems and resources. However, in practice the periodic sharing and dissemination of information is both critical and problematic. This research investigates the challenges in communication and collaboration between the participants involved, i.e. the authorities, during disaster events from a crisis management viewpoint. Different kinds of challenges (e.g. technological, social and organizational issues) typically arise when responding to these situations. This paper discusses a well-known technology - process modeling - that can be utilized for solving these issues and facilitating the management of them. Its potential to support and enhance the collaboration of participants in crisis management is investigated and evaluated. The aim is to study an interaction-supporting process model and therefore reduce the problems in communication between the different organizations involved. In relation to the process modeling technologies themselves, there is also a discussion of their utilization - especially the demands and prerequisites for using them - from the viewpoint of the various organization levels.

MF-03.3 [R] An Investigation into the Key Elements of the Chinese Shanzhai Model: Alternative Path to Growth, Cross-Specialization Partnership, and Opportunistic Niche Infiltration

Hung-hsiang Kao; National Cheng Chi University, Taiwan
Jen-fang Lee; National Cheng Chi University, Taiwan

How do small emerging-market late-entrants with weak capabilities and scarce resources overtake leading U.S. and European firms in emerging markets? To answer this question, this study investigates Chinese Shanzhai firms in mobile phone, automobile, and notebook PC through secondary data, firm interviews, and retail channel observation. The result of this study not only helps understand the Shanzhai innovation model but extends the theory of vertical alliance and provides other aspiring emerging-market late-entrants a framework for devising winning innovation strategies. This study finds the key to the rapid and steady rise of Chinese Shanzhai firms is their vertical alliance model characteristic of alternative path to growth, cross-specialization partnership, and opportunistic niche infiltration. First of all, these firms seek out room in the marginal areas of the existing industrial system by

changing their scope of operations and restructuring the value network. Secondly, they build up an open platform for innovation different from that of the incumbents through cross-industry partnerships for collaboration and value co-creation to make up for what they lack. Lastly, they target a niche market by providing maximized price-to-performance ratios and maintaining diverse product lines to then infiltrate the mainstream market.

MF-04 Patent Analysis - 2
Monday, 7/19/2010, 17:00 - 18:30
Room: Similan 2
Chair(s) Yosuke Shibata; Tokyo Institute of Technology

MF-04.1 [R] How to Measure the Semantic Similarities between Scientific Papers and Patents in Order to Discover Uncommercialized Research Fronts: A Case Study of Solar Cells

Naoki Shibata; The University of Tokyo, Japan
Yuya Kajikawa; The University of Tokyo, Japan
Ichiro Sakata; The University of Tokyo, Japan

In this paper, the authors perform a comparative study to measure the semantic similarity between academic papers and patents. Research fronts which do not correspond to any patents can be uncommercialized and opportunities for industry. Therefore, it is significant to investigate the relationship between the scientific outcomes and the pieces of industrial technology. We compare structures of citation network of scientific publications with those of patents by citation analysis, measure the similarity between sets of academic papers and ones of patents by natural language processing, and discuss the validity of the results with experts. After the documents (papers/patents) in each layer are categorized by a citation-based method, we compare three semantic similarity measurements between a set of academic papers and a set of patents: Jaccard coefficient, cosine similarity of tfidf vector, and cosine similarity of log-tfidf vector. A case study is performed in solar cells to develop a method investigating the corresponding relationship between papers and patents. As a result, the cosine similarity of tfidf is the best way to discover the corresponding relationship. This proposed approach enables us to obtain, at least, the candidates of unexplored research fronts, where academic research exists but patents do not.

MF-04.2 [R] System for Automatic Entrepreneurial Complementarity Search through Patents Data Bases

Paulo V Cordeiro; UTFPR, Brazil
Dario A Dergint; UTFPR, Brazil
Kazuo Hatakeyama; UTFPR, Brazil

The model of open innovation is the best choice for firms that cannot afford R&D costs but are intent on continuing to play the innovation game. This model offers to any firm the companies spread worldwide and in all research fields as possible partners in R&D. However, the possible partnership cannot be restricted in the managers know-who. The patent documents can be the source of rich information about technical development and innovation from a huge number of firms. Searching through all these documents created daily is a cumbersome task that technology managers cannot afford. This paper aims to introduce an automated model for matching between firms' R&D using data mining techniques applied to patent documents datasets. The methodology considers the search for patent documents from possible partners and this data treatment through association technique between IPC fields in the patents. An evaluation system was implemented, one example experiment was made and the results it reaches are patterns of technological knowledge interdependence that can be used to evaluate the complementarity between firms.

MF-04.3 [R] The Impacts of Academic Patenting on Paper Publication: A Quantity-Quality Examination

Yuan-Chieh Chang; National Tsing Hua University, Taiwan
Phil Y. Yang; National Taichung University, Taiwan
Tung-Fei Tsai-Lin; National Tsing Hua University, Taiwan

This paper examines the relationship between academic patenting and academic publication. Previous studies provided little investigation of how the quality and quantity of academic patent inventors may further influence their quantity and quality of paper publication. This paper explores four hypotheses to examine the impacts of patenting on publication. This paper collects the patenting and publishing data of 395 academic patent inventors from 5 major universities in Taiwan from 2002 to 2006. Our analysis indicates that better patents will breed more and better papers. More patents generate better but not more papers. The paper concludes that generating better patents can mutually reinforce the further publication.

MF-04.4 [R] Monitoring the Key Technology Trends by Combining Chance Discovery and Survival Analysis: Study on Solar Cell Patent Documents

Ming-Yeu Wang; National Chiayi University, Taiwan
Tzu-Fu Chiu; Aletheia University, Taiwan

Patents provide objective and rich information on technology, so it becomes a valuable source to monitor. The fact that the technological information on patents is almost stored in text format makes the monitoring task a hard work. The purpose of this study is to introduce a new approach which combines chance discovery, one of a text mining techniques, and survival analysis to explore the emergence of technology terms and to identify their potential. This study applies the chance discovery to extract technological terms which are important but occur infrequently. Moreover, this study conducts longitudinal analysis by employing survival analysis on the occurrence time for the extracted technological terms. The hazard rate is used as an indicator to identify the potential of the terms. This study collected solar cell patent documents from both issued and applied databases to perform the proposed approach. The patents of 2001 to January 2005 serve as experimental samples to calculate the hazard rates of extracted technological terms, and those from July 2005 to 2008 are for validity testing. The results reveal that there is a high correlation between the hazard rate and the patent numbers for extracted technological terms.

MF-05 Innovation Management - 3
Monday, 7/19/2010, 17:00 - 18:30
Room: Arcadia Hall 1
Chair(s) Jeong-Dong Lee; Seoul National University

MF-05.1 [R] A Trend Analysis of Innovation Issue: TECHNOVATION 1995-2009

Shann-Bin Chang; Ling Tung University, Taiwan
Zhi-Xum Pan; Ling Tung University, Taiwan

Technology Management, which not only has high complexity but also combines multiple knowledge systems, is an emerging discipline in social science. What have been the major issues confronting technology management during the past two decades? Which issue is at the core of technology management? We can say that innovation is a very important and critical issue in technology management. Academic papers have discussed many kinds of innovation during these two decades. Therefore, the purpose of this paper is to discuss the trend development of the innovation issue. TECHNOVATION journal serves as the main source of this study. This journal is an international academic journal which has been published since 1981 and discusses the issues around technological innovation, entrepreneurship and technology management. TECHNOVATION also has a higher impact factor in the SSCI. This study analyzed 273 papers in TECHNOVATION from 1995 to 2009. All of these papers contained innovation in the keywords field. This paper analyzes the distribution across years, nations, and authors, and discusses the research methodologies, domain industries, and the relevant innovation issues. The results present seven conclusions and summarize the profiles of innovation literature which were published in TECHNOVATION during the past 15 years. These profiles can help scholars find new materials or directions more efficiently in future studies. However, some suggestions were proposed which can modify this paper more clearly.

MF-05.2 [R] Evaluation Innovation Research Performance and Trend of the Worldwide

James K Chen; Asia University, Taiwan

Yuh-Shan Ho; Asia University, Taiwan
Ming-Huang Wang; Peking University, Taiwan
Yih-Young Chen; Chinese Culture University, Taiwan

Innovation is one of the most important fields in research and development of new knowledge or service today, making the research innovation trend an important issue. This study evaluates the worldwide innovation development trend of research for the past 16 years and provides insights into the characteristics of innovation research activities to identify an innovation development map, tendencies, or regularities that may exist in papers. Data are based on the online version of SSCI, Web of Science from 1993 to 2008. Articles referring to innovation were assessed according to many aspects including exponentially fitting publication outputs during 2002-2008, distribution of source title, author keywords, and keyword plus analysis. The exponential fitting of the yearly publications of the last decade can also calculate that, in 2014, the number of scientific papers on innovation will be twice the number of publications in 2008. Synthetically analyzing four kinds of keywords, this work analysis concludes that innovation application relates to issues based on knowledge, technology, R&D and entrepreneurship. The result displays that the USA is number one in innovation research totaling 6,317 papers, followed by the UK totaling 2,354 papers. Other leading countries in innovation research include Canada, the Netherlands, Germany, France, Australia and Italy. This new bibliometric method can help researchers realize the panorama of worldwide innovation research, and establish further research directions.

MF-05.3 [R] Innovation Profiles of Outstanding Companies in Taiwan: An Open Innovation Perspective

Ju-Miao Yen; National ChengChi University, Taiwan
Mei-Ya Wang; Shih Hsin University, Taiwan
Yi-Wen Chen; Tamkang University, Taiwan

Community Innovation Surveys (CIS) have been widely used in recent years to study open innovation (OI) activities, which have become a hot issue. While most research has aimed for a general overview of the OI activities in a specific country, this study, which pertains to OI activities in Taiwan, focuses on outstandingly innovative firms to benchmark and examine country-specific industrial characteristics, from which implications for innovation policies can be derived. Several findings emerge from our survey. First, Taiwans outstanding firms have the best scores in regard to search breadth and depth dimensions, which indicate that in a small and export-oriented economy, these firms emphasize diverse information sources. A comparison of breadth and depth dimensions shows that they perform significantly better in the former than in the latter. Second, an analysis of the different categories of firms shows that manufacturing, SMEs and award-winners have more aggressive OI strategies than do service, large and non-award winners. Third, with respect to R&D factors, external innovation breadth is negatively correlated with R&D intensity, whereas depth indicators have a higher explanatory ability in regard to R&D expenditure. Finally, with respect to innovative performance, again external innovation depth is the main driver of the financial performance of companies. The implications for innovation policies are discussed.

MF-05.4 [R] A Review of the Three Streams of Consumer Innovativeness

Reza A Nasution; Institut Teknologi Bandung (ITB), Indonesia
Nita Garnida; Institut Teknologi Bandung (ITB), Indonesia

Researchers are grouped in one of three streams in looking at consumer innovativeness. The first one defines consumer innovativeness as a general trait that is applicable across different product categories. The second one defines consumer innovativeness as a category-specific predisposition that is not transferrable to other categories. The third one combines the two previous perspectives by taking the general characteristics of individuals in innovation adoption and category-specific factors that will moderate the role of general innovativeness in the adoption process. In this paper we review each stream in order to develop an understanding on how to connect those streams to better predict product adoption by consumers.

MF-06 Technology Adoption and Diffusion - 3
Monday, 7/19/2010, 17:00 - 18:30

Room: Arcadia Hall 2
Chair(s) Charles M Weber; Portland State University

MF-06.1 [R] A Theoretical and Empirical Comparison of Innovation Diffusion Models Applying Data from the Software Industry

Martin Hewing; Technische Universitat Berlin, Germany

This paper presents a theoretical and empirical comparison of quantitative innovation diffusion models with data from the software industry. Looking at some of the most widely used aggregate models, such as the Generalised Bass (1994) or the Kalish (1985) model, the inclusion of decision variables is compared to scientific groundings from innovation marketing, focusing on the analysis of their mathematical equations. Eligible attributes such as the reduction and the carry-through effect are addressed and performance simulations of the mapping function are run, using commonly observed pricing strategies. Adoption and marketing data of two innovative software products are applied to calibrate the models and to evaluate their forecasting precision by comparing the results with true data within a period of ten month after initial release. It becomes evident that the predominant S-shaped models are not always suitable. A market analysis shows the complexity of market structures and the involved requirements for these models. Critical branch related aspects, such as the reputation of the company, online distribution channels, and piracy are discussed and disclose future research spots in the estimation of diffusion shapes of innovative products.

MF-06.2 [R] Why do Firms Acquire External Technologies? Understanding the Motivations for Technology Acquisitions

Simon J Ford; University of Cambridge, United Kingdom
David Probert; University of Cambridge, United Kingdom

Why do firms acquire external technologies? Previous research indicates that there are a wide variety of motivations. These include the need to acquire valuable knowledge-based resources, to improve strategic flexibility, to experiment, to overcome organizational inertia, to mitigate risk and uncertainty, to reduce costs and development time in new product development, and the perception that the firm has the absorptive capacity to integrate acquisitions. In this paper we provide an in-depth literature review of the motivations for the acquisition of external technologies by firms. We find that these motivations can be broadly classed into four categories: (1) the development of technological capabilities, (2) the development of strategic options, (3) efficiency improvements, and (4) responses to the competitive environment. In light of this categorization, we comment on how these different motivations connect to the wider issues of technology acquisition.

MF-06.3 [R] Bridging the Gap between Artificial Market Simulations and Qualitative Research in Diffusion of Innovation

Brent A Zenobia; Portland State University, United States
Charles M Weber; Portland State University, United States

Artificial markets (AMs) are an emerging form of agent-based simulation (ABS), in which agents represent individual consumers, firms, or industries interacting under simulated market conditions. The validity of the method depends on the ability of researchers to construct simulated agents that faithfully capture the key behavior of targeted entities. Without such a correspondence the simulation cannot be considered to be a valid representation of market dynamics. To date, no such correspondence has been established. Yet, for artificial markets to achieve their potential as a tool for marketing practice, it is crucial that closer ties be forged with mainstream methods for consumer behavioral research, especially qualitative methods. The primary contribution of this article is a novel method combining qualitative marketing research (inductive case studies, grounded theory, and sequence analysis) and software engineering techniques to synthesize simulation-ready theories of consumer behavior. The authors provide a step-by-step explanation and a demonstrative example of theory-building from the consumer technology adoption domain. The outcome is a theory of consumer adoption behavior that is sufficiently precise and formal to be expressed in unified modeling language (UML). The article concludes with a discussion of the limitations of the method, recommendations for its implementation in the study of diffusion of innovation

(DOI) and suggestions for further research.

MF-06.4 [R] Impact of Technology Integration on Olive Farming in Central Namibia

Kenneth K Matengu; University of Namibia, Namibia
Hina Mu Ashekele; University of Namibia, Namibia

Namibia is one of the largest countries in southern Africa, with 825,418 sqkm of territory. Its climate is marked by extremes in temperate and rainfall between north, central and southern parts. Most of Namibia receives less than 450 mm of rainfall on average per year. Over the past 70 years, Namibia has traditionally been agricultural with livestock and crop farming being the mainstay. More recently, owing to global growth in innovations and information flows, demand to diversify and venture into cash crops and olive farming in particular has grown. Along the advocacy for innovation and growth, it has been argued that the integration of modern technology has far-reaching impact on the economy, on the environment and food production. However, there has been little emphasis on the factors and systems that promote and/or impede technology integration. The objective of this paper is to examine and present empirical evidence on factors that contribute to the successes and/or failures in technology integration. A case study on integrating diverse forms of technology in farming olives in an arid environment is presented. The case study focuses on the diffusion of olive farming technology at Hochfeld, north central Namibia. This case represents an attempt for technology applications and cooperation on product development between a higher education institution and the private sector. Overall, the results support the view that quality networks between entrepreneurs and universities, existence of a supportive policy and institutional framework, as well as a defined R&D program sustain successful technology adoption and increase farm productivity.

MF-07 Outsourcing - 1
Monday, 7/19/2010, 17:00 - 18:30
Room: Lagoon Hall 1
Chair(s) Jamie Rogers; University of Texas - Arlington

MF-07.1 [R] Key Success Factors for Managing Offshore Outsourcing of Software Production Using the ICT-Supported Unified Process Model: A Case Experience from Finland, India, Nepal and Russia

Anicet Yalaho; University of Jyväskylä, Finland
Nazmun Nahar; University of Jyväskylä, Finland

Successful management of offshore outsourcing projects can provide various and important benefits to companies. However, ICT-supported offshore outsourcing of software development is complex, risky, and often fails. An in-depth literature review shows that very limited empirical studies are available on the factors that affect the success of offshore outsourcing of software development. We utilize a multiple case study method for both the vendors (from India, Nepal and Russia) and clients (from Finland) sites, where professionals with extensive experience in managing offshore outsourcing of software development are interviewed. Through an in-depth empirical research study, we identify a list of critical factors that affect the success of such projects. In addition, we also investigate how these factors enhance success. The research findings provide a clear picture of the types of resources required to make this kind of complex undertaking successful. By using the research results, companies can facilitate successful completion of ICT-supported offshore outsourcing of software development projects. We also discuss the implications of the findings for both practice and research.

MF-07.2 [R] Managing Multi-Vendors in Software Production through International Outsourcing: A Conceptual Perspective

Antti Ilmo; Saranen Consulting Oy, Finland
Nazmun Nahar; University of Jyvaskyla, Finland

If successful, various important benefits can be achieved by using multi-vendors in software production through international outsourcing. However, the undertaking is complex and risky. There are numerous studies on IT outsourcing in general, but there is a significant lack of studies dealing with managing multi-vendors in producing software through international outsourcing. This study has been undertaken to fill in this void. It has focused on the reasons for using international outsourcing and multi-vendors, success and risk factors, the vendor selection process, and the management of multi-vendors relationship. It develops an all-encompassing model that deals with the selection and management of multi-vendors in software production through international outsourcing. The results of this study show that there are various risks involved in international outsourcing by using multi-vendors. The use of multi-vendors in particular needs to be considered carefully. This study also identifies key success factors for managing multi-vendors in software production. The implications of the findings are discussed for both practice and research.

MF-07.3 [R] The Moderation of Environmental Dynamism between R&D Outsourcing and Firm Innovation Performance

Bei Wu; ZheJiang Gongshang University, China
Chen Jin; ZheJiang University, China

R&D outsourcing has become a new trend and has gained more and more concern in recent years. This study empirically examines the moderation of environmental dynamism in which both novel and routine R&D outsourcing influence a firm's innovation performance. Based on 70 samples of industrial firms in China, the results indicate that environmental dynamism moderates the relationship between novel R&D outsourcing intensity and firm innovation performance while it does not moderate the routine R&D outsourcing intensity and firm innovation performance.

MF-08 E-Business - 1
Monday, 7/19/2010, 17:00 - 18:30
Room: Lagoon Hall 2
Chair(s) Irtishad Ahmad; Florida International University

MF-08.1 [A] EC 2.0: Can You Get Profit by Writing Blog? An Empirical Study in Google Adsense

Kei-Shao Chen; National Chung Hsing University, Taiwan
Ming-Huei Chen; National Chung Hsing University, Taiwan

The e-commerce market as well as its service providers grow vigorously day by day, and the author observes that the e-commerce market begins commercial operation of the different approach to the provision of innovative services by bloggers who are able to get profit by a new EC 2.0 business model. This article is based on a hit financial blog, Bonddealers Blog, which uses the AIDA model to analyze the important factors of the blog content to attract users to view and read it continuously. It references these obtained important factors and then produces a variety of blog content experimentally, including text, image and audio-visual, embedded Google's programs grammar in these content by Google Adsense advertising network model. Further, the author uses the practical application of this innovative service to teach, guide students to collect or produce the information provided for users to view, to read, to click and get high traffic and revenue, and finally to generalize the key success factors (KSFs) for the process of getting profit by clicking ads in EC 2.0 business model. As a result, the author hopes that research results can provide the next network marketing personnel and researchers in institutions as references.

MF-08.2 [R] An Empirical Study of the Effects of Permission on Mobile Advertising Effectiveness

Phumisak Smutkupt; Asian Institute of Technology, Thailand
Donyaprueth Krairit; Asian Institute of Technology, Thailand
Vatcharaporn Esichaikul; Asian Institute of Technology, Thailand

Advertisers are now enjoying the next stage of marketing where the mobile medium plays a significant role as a means of commercial communications. The effectiveness of this new channel can be witnessed through the rise in popularity of mobile advertising. The underlying reasons for this phenomenon could be the rapid proliferation of mobile platforms and the unique characteristics inherent in the mobile medium. However, due to the personal nature of this tool, to ensure the most effective mobile advertising campaigns, many believe

permission is an essential requirement. This study investigates the effects of permission on the effectiveness of short message service (SMS) advertising through an experimental study. The study used real advertising campaigns from an existing brand to stimulate consumer attention and response. The results indicate that permission is an influential factor for brand attitudes and purchase intention, but marketers cannot rely on its impact on attitude toward mobile advertising. Implications of this research for marketers are discussed and suggestions for future research avenues are provided.

MF-08.3 [R] Challenges of Integration and ICTs Potentials in the Globalized Construction Industry

Irtishad Ahmad; Florida International University, United States
Maung K Sein; University of Agder, Norway
Kamalesh Panthi; Florida International University, United States

It is widely accepted that information and communication technology (ICT) promotes efficiency in communication and as a result, brings increased effectiveness in the process of construction. It is inconceivable that today's large construction projects with the vast volume of information processed can be run at the necessary speed without using ICT. This is especially true in the today's global context. However, we argue that in construction ICT is used mainly as mere enhancement tools, and not as means that can transform and thus revolutionize the process of construction. In this paper, we address this critical question: How is ICT impacting the process of construction and what are its potentials? We contend that the answer to this question lies in the integration potential of ICT. We conceptualize three aspects of integration, informational, organizational and contractual, as the basis to examine ICT's potential and illustrate this conceptualization by analyzing two widely used technologies in construction, namely Building Information Modeling and data warehousing. Our analysis reveals that these technologies have features that can foster all three levels of integration. However, looking at the construction industry as a whole, we conclude that while informational integration has been achieved, the industry is far from achieving organizational and contractual integration.

MF-08.4 [A] The Influences of System Quality and Service Quality to Consumer Satisfaction and Loyalty in On-Line Game Industry

Yi-Hsien Tu; Minghsin University of Science & Technology, Taiwan
Ke Ming Hung ; Yu-da University, Taiwan

Recently, Taiwan's sales revenue of online games market is rapidly growing year on year. As the internet becomes more pervasive, more and more companies joined this market and tried to gain profit. However, the key to success in this market is consumer satisfaction and loyalty. As a result, based on the literature, the research proposed two variables (system quality and service quality), which may influence consumer satisfaction and loyalty in the online game market. The research used the quantitative research method, and a questionnaire was used to collect research data. The result of the study indicates that the in-time service was the factor that influences customer repurchase intention. The system security will influence the intention to recommend the game to others. Moreover, the service quality and system quality will influence the consumers satisfaction for the game. Surprisingly, there is no significant relationship between consumer satisfaction and loyalty in the online game industry.

TA-01 PLENARY - 3

DATE: TUESDAY, 7/20/2010
TIME: 08:00 - 9:30
ROOM: BALLROOM A
CHAIR: KIYOSHI NIWA, THE UNIVERSITY OF TOKYO, JAPAN

TA-01.1 Strategies to Questing for Top Researchers/Scientists in the Next Decade

Manoo Ordeedolchest; Sripatum University, Thailand

Looking at the ways social behavior changes in response to the change of technologies, one has to agree that in the near future, our young talent will definitely choose how they work, where to work, when to work and for whom they work, as long as they produce the expected results. This makes it difficult for organizations to manage their workforces, particularly the scarce knowledge workers including researchers and scientists. Unless organizations learn to work with external specialists, they will face the problem of not being able to hire enough qualified in-house talent. We will be forced to do collaborative research with researchers around the globe. Commercialization and utilization of intellectual properties will be even more difficult due to the lack of qualified personnel; marketing IP will require a significantly more complex set of interdisciplinary skills. We will need a more service logic approach to market IP, meaning we must treat our clients as co-creators and work with them and engage with them to reach the final solution: working with them as trustworthy partners.

TA-01.2 Picking Up the Pace: Utilities and Innovation in a Carbon Constrained World

Terry Oliver; Bonneville Power Administration, United States

Non-carbon generation requires a re-think for electric utilities. Variable generation resources such as solar and wind push utility operations beyond normal comfort zones and place greater emphasis on energy storage and smart grid, and consequently on research and development. Bonneville Power Administration, an electric system in the Northwest corner of the United States is a leader in R&D, smart grid, and wind generation integration. Bonneville's breakthrough work to integrate large wind generation into the 500kV grid, advance smart grid and synchrophasors, and to imagine the next generation electric grid will be highlighted. Bonneville operates 24,523 km of high voltage transmission, serves 145 retail utility systems, and markets about 80 GWh each year. The Federal Columbia River Power System, Bonneville's power supply source, has a peak capacity of 13 GW.

TB-01 Disruptive Technologies - 1
Tuesday, 7/20/2010, 10:00 - 11:30
Room: Ballroom A
Chair(s) Stefan Husig; University of Regensburg

TB-01.1 [R] The Impact of Emerging Public W-LANs on the Response Strategy of Incumbent Mobile Network Operators in the German Telecommunications Market

Farsan Madjdi; Madjdi Consulting, Germany
Stefan Hüsig; University of Regensburg, Germany

According to many studies, incumbent companies often struggle to respond adequately when faced with technological discontinuities. This research examines how three incumbent mobile network operators (MNOs) in Germany responded in terms of their strategy to the emergence of the wireless local area network (W-LAN) technology and how they interpreted this potentially disruptive technology in their own strategic context. Additionally, prior empirical results and forecasts on the limited disruptive potential of W-LAN for the German MNOs lacked persuasive firm-level evidence to distinguish the real reason for the presented observations and analysis. It is unclear whether the observations are caused by theory-adequate response strategies of incumbent MNOs or by the inherent limited disruptive potential of the W-LAN technology. For this purpose, interviews with managers from three major MNOs in Germany were performed to assess and compare their respective response strategies with the theory of disruptive technology. The results were brought together in a cross-case analysis to evaluate how these firms interpret the potential disruptiveness. The analysis of the research indicated significant differences for the respective MNOs between their perception of W-LAN as a potential disruptive technology, their strategic development processes inside the organization to understand the potential impact of W-LAN on their respective business model, and to enforce an appropriate response strategy and structural

implementation. The results indicated that corporate representatives from each incumbent interpreted potentially disruptive technologies like W-LAN from a different perspective and direction depending primarily on the strategic and structural context and their organizations resources, processes, and values. These findings finally revealed that the incumbent MNOs in Germany were aware of the potential impact of disruptive technologies on their established business, and evidence was found that they considered potential solutions suggested by the literature and added new options like cooperation with entrants to resist in such situations. However, they failed to react in a theory-conforming way, which indicates a lack of in-depth understanding of the theoretical implications since W-LAN had a sustaining impact on the MNOs and their response strategies.

TB-01.2 [R] An Assessment Framework for Disruptive Innovation

Chang Chieh Hang; National University of Singapore, Singapore
Jin Chen; Zhejiang University, China
Dan Yu; National University of Singapore, Singapore

Although the disruptive innovation (DI) theory of Christensen has nowadays been accepted by academics and practitioners as a powerful innovation strategy, many have only viewed it from a particular perspective such as market development that is not sufficient to judge confidently if an early stage DI case has a good chance to succeed. In this paper, we shall present an assessment framework that captures the essential characteristics and holistic success factors for DI; they are grouped under market positioning, technology and other favorable drivers. Three well-known cases, namely the steel minimill of Nucor, the 3.5 inch disk drive of Conner/Seagate, and the limited mobile phone system/product of UTStarcom, are then presented to illustrate the use of this systematic framework in assessing the success potential of these cases of DI in either the low-end or new markets. A fourth example of Googles web-based office applications would then illustrate how the framework may be used to study the disruptive potential of a new product. The framework has the potential to be further developed into a systematic tool for answering the question of whether the DI Theory could indeed be used to provide ex ante prediction of the success of a new DI.

TB-01.3 [R] Technology and New Digital Sensibilities: Impact of Digital Text 2.0

Shishir K Jha; Indian Institute of Technology Bombay, India
Rojers P Joseph; Indian Institute of Technology Bombay, India
Neeraj Mankad; Indian Institute of Technology Bombay, India

Technology has always played a vital role in making material available to readers, since the printing press was invented in the fifteenth century. Various improvements in the technology of the print, from offset to desktop, have had dramatic impact on the cost and access of printed material. However, with the arrival of Digital Text, we may now be entering an entirely new era of publishing, which we think will substantially alter the relationship among the reader, the text and the mediating digital technology. A rich hyper-linked text that invites a reader to digitally explore several other web-linked ideas and references will begin to produce a substantial 'non-linear' engagement with the text. This Digital Text 2.0 will introduce, in our opinion, a radical shift in how we relate, understand and engage with textual information. Such digital text, when viewed through a plethora of digital devices such as desktops, eBook readers or mobile telephones, will serve to richly increase both access and new sensibilities. Through an extensive literature review and selected cases, we would like to specifically examine how such digital (hyper-linked) technology is altering the textual landscape and how it can be better managed from the perspective of the end user.

TB-02 Decision Making - 1

Tuesday, 7/20/2010, 10:00 - 11:30
Room: Ballroom B
Chair(s) Jetsura Vongvichien; Dhurakij Pundit University International College

TB-02.1 [R] The Development of GDSS to Support Group Decision Making through the Improvement of the Participation of Thai Graduate Students

Jetsura Vongvichien; Dhurakij Pundit University International College, Thailand

This research discusses the development of group decision support system (GDSS) software with updated functionalities that may enhance group interaction in a face-to-face brainstorming mode. Some of the functionalities include multi-language simultaneous input capabilities, including Thai, and the utilization of generic keyboard connections via USB. The developed software aims to facilitate, enhance and improve the level and efficiency of participatory learning of mixed groups of Thai and foreign students. This enhanced GDSS may also be used in a business group decision-making environment. Furthermore, to overcome the shy nature of Thai people, the option of a non-identification of participant features is integrated into this GDSS. A pilot study has been conducted to exchange ideas, comments or solutions regarding assigned topics in an actual classroom setting / brainstorming session in order to investigate the learning effectiveness and the overall users satisfaction with the software support. The enhanced software makes the designed GDSS more generic and suitable for not only graduate classroom environments but also for most types of group decision support approaches, such as consensus business decision making, and strategic goal planning in particular with regards to multicultural and multilingual environments. The research outcomes may also lead to identifying preferred features required of a GDSS facilitator in the future.

TB-02.2 [R] Technology Intelligence: Methods and Capabilities for Generation of Knowledge and Decision Making

Oscar F Castellanos; National University of Colombia, Colombia
Luz M Torres; National University of Colombia, Colombia

The creation of value based on the generation of knowledge is a key factor due to the need of facing changes in the environment, especially those technological. That is the reason why formal intelligence systems have got a position due to their versatility to identify endogenous abilities and changes in the surrounding environment through the transformation of data into knowledge with a strategic value. The main question is which abilities an organization should have for implementation of intelligence systems and what methods to use for transforming information into knowledge. After these are defined, it would be possible to transcend a purely theoretical intelligence system to a model allowing its explanation, one that goes beyond information technologies and ensures mechanisms of knowledge management. Because of the aforesaid, this paper presents first a novel system of technology intelligence, which retakes the basis of biological metaphor and complex systems. It is constituted by three components: knowledge generation, integration of tools for technological management and strategy issue and implementation. Secondly, some considerations are established for its application taking as a reference the experience of its application in 23 sectors. Such an experience has shown the impact of technology intelligence in innovation, knowledge management and decision making.

TB-02.3 [R] DSS: Measurement and Evaluation of an Experiment

Jacob Adams; The University of North Dakota, United States
Jose Lamas; University of Lima, Peru
John Walsh; The University of North Dakota, United States

A process of system validation is important to the success of decision support systems (DSS). Without proper validation, DSS may yield errors which entail enormous costs. Nevertheless, DSS literature has not provided effective methods to validate such computer-based systems. In this paper we propose a new method to validate DSS. Our approach combines several validation methods developed to validate operations management models and a set of best practices of DSS development. A detailed example illustrates the effectiveness of the developed method and its potential use.

TB-02.4 [R] Measurement of Innovativeness in an Organization Using AHP

Karuna Jain; Indian Institute of Technology Bombay, India
Qutbuddin Siddiquee; Indian Institute of Technology Bombay, India
Vivek Singal; Crompton Greaves Ltd, India

Recent studies have advocated different organizational capabilities and discussed their impact on a firms competitive performance. In this research paper, a new framework for innovative capabilities has been identified and a method to measure innovativeness is proposed.

Innovativeness of the firm is directly related to the firms R&D and can be measured through various indicators such as knowledge capabilities, innovation conversion, R&D infrastructure, R&D capabilities, marketing capabilities and manufacturing capabilities. In this paper, an AHP-based method is proposed to measure the innovativeness of an organization.

TB-03 Project/Program Management - 1
Tuesday, 7/20/2010, 10:00 - 11:30
Room: Similan 1
Chair(s) Peerasit Patanakul; Stevens Institute of Technology

TB-03.1 [R] The Role of Commitment for Managing Complex Multinational Projects

Hans J Thamhain; Bentley University, United States

Commitment from all stakeholders is a critical condition for project success, especially for complex and multinational undertakings that involve intricate networks of resource and power sharing. The challenges of building and sustaining commitment in culturally and globally diverse teams are examined in a field study of 35 multinational, high-technology product developments. The results of this study identify (1) the components of commitment in various stakeholder groups, (2) the drivers and barriers to obtaining and sustaining commitment, and (3) the leadership style most conducive to fostering an organizational environment for high levels of project ownership and commitment to established project objectives. The findings provide an insight into the factors which influence team behavior and performance in complex multinational work environments, and a framework for assessing project leadership and managerial effectiveness. The paper concludes with specific suggestions for enhancing commitment within the project organization, its team members and partners. The presentation will be designed to stimulate critical thinking, dialog and experience sharing.

TB-03.2 [R] Don Quixote Reborn? Managing Offshore Wind Turbine Projects

Christian Koch; Aarhus University, Denmark
Jes Søndergaard; Aarhus University, Denmark

Offshore wind turbine power plants are expected to grow by 45 percent during the period 2009-2015. These large-scale infrastructure energy projects are characterized by a number of risks. These projects are high-profile but at the same time, they suffer from time delay and cost overrun. They may trigger mechanisms such as scope creep and strategic political considerations similar to those found in other infrastructure investments, such as railroads, motorways, tunnels, etc. This paper explores the possibilities of using reference class forecasting (RCF) as a means to create a more precise and instrumental governance of these projects. RCF improves budgeting by identifying a relevant sample of previous similar projects, based on which a statistical distribution of outcomes for the reference class projects is generated. This method is officially endorsed by the American Planning Association. Using publicly available data, the paper analyzes whether differences in geotechnical conditions, technological differences in turbines, towers, foundations, cables, installation methods and more variability of previous offshore wind turbine power plant projects justify classification into two reference classes. It is claimed that RCF and a life-cycle scope are needed to improve future investments in offshore wind energy.

TB-03.3 [R] Why Mega IS/IT Projects Fail: Major Problems and What We Learned from Them

Peerasit Patanakul; Stevens Institute of Technology, United States
Saif Syed Omar; Stevens Institute of Technology, United States

With large scope and high degree of complexity, managing megaprojects is often a challenge to many project managers. Many projects fail miserably. Research has shown that success in managing megaprojects requires a great deal of coordination and collaboration which can be done through established processes, a strong team, and involvement of stakeholders. Even though these processes and approaches are known, effectively implementing them can be difficult. This study investigated the management of selected mega IS/IT projects in the US, UK, and Australia; identified common problems; and discussed some lessons learned. Since the literature on megaprojects primarily focuses on major construction projects, the results of this study will provide significant contributions to the literature and implications for practitioners.

TB-04 Patent Analysis - 3
Tuesday, 7/20/2010, 10:00 - 11:30
Room: Similan 2
Chair(s) Yoshitoshi Tanaka; Tokyo Institute of Technology

TB-04.1 [R] Research on the Factors How to Avoid Un-utilized Patents to Support Strengthening Technology Management

Yoshitoshi Tanaka; Tokyo Institute of Technology, Japan

For the enterprises aiming for technology-based businesses with R&D, intellectual property (IP) management has an important role to further their business growth through technology management. Japan has been one of the leading countries from the aspect of the number of patent applications. However, the ratio for granting patents is approximately 35 percent; also, it is pointed out that the ratio of un-utilized patents out of the number of patent applications is about 18 percent. In order to make IP activities contribute to the competitiveness of enterprises, it is strongly suggested that the strategy of patent applications be revised, with drastic changes in the large number of un-utilized patents. In this research, the reason for the huge number of patent applications is discussed with the deductive approach considering our institutional factors, and focusing down to the lack of integration of IP departments with enterprises other functional departments. The integration level is investigated with questionnaires to the industry. Based on the results of questionnaires, it was clarified that there exist certain factors regarding why so many un-utilized patents are generated. Also, IP peoples consciousness on the importance of the integration was clarified with interviews, and recommendations were made about how we should change our patent strategy to support strengthening technology management.

TB-04.2 [R] Patent Citations as a Method for Analysing Industrial Convergence

Matti Karvonen; Technology Business Research Center, Finland
Tuomo Kässi; Lappeenranta University of Technology, Finland

Despite the fact that convergence of technologies is seen as a major driver of change in many industry settings, the phenomenon has remained largely unexplored in the academic management field. The citations data of patents have been used to get an idea of the stage of industry emergence in the context of the paper and electronics industry. Patent data was collected from the 87 main players operating in the RFID value chain. The analyzed firms had altogether 464,225 patent applications and over 3.3 million citations in the period 1978-2006. We distinguish self citations from external citations, and further divide external citations into two groups: within the industry and beyond the industry citations. Self citations typically imply a more competitive position in that field (capability); external citations may suggests that the citing firm is entering a technological competition within (competition) or beyond (diversification) industry. The recognized trends of the growing overlaps of the technological fields show indications for convergence between industries. So for traditional electronics industry players, strategically important knowledge is pointed out for their future competitive area. This type of patent analysis helps to recognize trajectory changes early in the industry and helps companies to make strategic decisions accordingly.

TB-04.3 [R] A Probabilistic Approach to Identifying Technology Vacuum: GTM-based Patent Map

Changho Son; Seoul National University, Korea, South
Yongyoon Suh; Seoul National University, Korea, South
Youjen Lee; Seoul national university, Korea, South
Yongtae Park; Seoul National University, Korea, South

A patent map has long been considered as a useful tool to identify technology vacuum defined as an unexplored area of technologies that may deserve intensive investigation for future new technology development. However, previous studies for identifying technology

vacuum on the patent map have been subjected to intuitive and manual identification of technology vacuum. In this context, this paper proposes a generative topographic mapping (GTM)-based patent map which aims to identify technology vacuum automatically. Since GTM is a probabilistic approach to map a low-dimensional latent space onto the multidimensional data space and vice versa, it contributes to the automatic identification of technology vacuum. This study consists of three stages. Firstly, text mining is executed to transform patent documents into keyword vectors as structured data. Secondly, the GTM is employed to develop the patent map with extracted keyword vectors and discover patent vacuums which are expressed as blank areas in the map. Lastly, technology vacuums are identified by inversely mapping patent vacuums in latent space into new vectors in data space. The procedure of the proposed approach is described in detail by employing a patent database.

TB-04.4 [R] A Method Study on the Technological Innovation Knowledge Diffusion Based on the Patent Citation

Feifei Wu; Beijing University of Technology, China
Lucheng Huang; Beijing University of Technology, China

The concept of technological innovation knowledge diffusion is discussed in this paper. We introduce a methodology for analyzing the knowledge diffusion based on the patent citation. To illustrate the methodology, the semiconductor industry was taken as an example to describe the knowledge diffusion mapping of the original patent. The method proposed for studying technological innovation knowledge diffusion problems provides a new way of thinking about this topic.

TB-05 Commercialization of Technology - 1
Tuesday, 7/20/2010, 10:00 - 11:30
Room: Arcadia Hall 1
Chair(s) Kumiko Miyazaki; Tokyo Institute of Technology

TB-05.1 [R] Developing Organizational Ambidexterity in Academic Research Commercialization

Phil Y Yang; National Taichung University, Taiwan
Yi-Chang Yang; Shih Chien University, Taiwan
Hong-Tien Chen; National Taichung University, Taiwan

This paper examined the relationship between organizational ambidexterity and research commercialization in universities. The paper develops two types of organizational ambidexterity: structural ambidexterity and contextual ambidexterity that influence research commercialization. Through a dataset of 474 academic patent inventors in Taiwan, the paper revealed structural and contextual ambidexterity factors are patenting-, licensing- and start-up-specific. To promote academic research commercialization, it is necessary to build up a university as a dual structural organization that allows pursuing research excellence and research commercialization at the same time.

TB-05.2 [R] Overcoming Deadlocks for Technology Commercialization by Finding Appropriate Applications

Kensuke Kato; EffecTech, Inc. / Tokyo Institute of Technology, Japan
Kumiko Miyazaki; Tokyo Institute of Technology, Japan

Even though candidate applications of emerging technologies cover a broad field of markets, the development of new businesses based on new technologies does not progress as expected at all. Commercialization faces a series of deadlock during the process, for example, the anticipated application markets do not emerge as expected. The inhibitory factors for the progress are not simply due to technological development issues. Other issues, such as further progress of competitive technologies, infant progress of necessary complementary technologies and shortage of social requirements, may arise which are difficult to be solved by a firm in the short term. What are the deadlock factors preventing new business development? In this study, setting application paths for emerging technologies for commercialization to overcome deadlocks is examined. In order to establish a structure and analyze the deadlock, a shotgun approach is proposed as a methodology by considering multiple possibilities for the applications and finding the inhibitory factors. The method is applied to the cases of mobile fuel cell and fluid MEMS. Based on these analyses, since the major inhibitory factors are difficult to be solved in the short term, the application markets should be modified. Therefore, establishing and modeling paths to create a final market are crucial not only for commercialization but also for accumulating knowledge, building technology competence, and anticipating social requirements with increasing reliability.

TB-05.3 [R] Empowering Technology Marketing by the Innovation Support Technology (IST)

Hitoshi Abe; Japan Techno-Economics Society, Japan
Atsuko Koizumi; Hitachi, Ltd., Japan
Junji Nagata; OKI Electric Industry, Japan
Gaston Trauffler; Luxinnovation GIE, Japan

In this paper, we review technology marketing research activities and we define technology marketing as promotion and acceleration of creating and commercializing product innovation. The paper is based on the assumption that today and even more in the future, conventional marketing research approaches at product development are more and more changing. Our understanding is that besides customer centered approaches such as lead user research, engineers will also be more involved to recognize new business opportunities, to generate corresponding ideas to finally conceptualize radically innovative products. Products are becoming technically more complicated so that potential users, who are often lacking technological and commercial awareness, cannot easily articulate their needs being unconscious of all the possibilities that modern technology offers. This understanding of technology marketing research is known as Kameoka and Mengs (2004) fourth generation technology marketing within the model of marketing paradigm. We believe in the necessity of empowering and testing the fourth generation innovation model as part of the innovation support technology (IST). IST is a method developed and applied in many real-world cases since autumn 2002 by the JATES Study Group. Its purpose is to offer a solid tool for engineers and researchers in order to enhance technology marketing. It consists of a business modeling method, a strategic road mapping method, and an innovation architecture method.

TB-05.4 [R] Challenging Current Model in Exploiting University-based Inventions

Marko Seppanen; Tampere University of Technology, Finland
Reetta Orsila; Tampere University of Technology , Finland
Reetta Heinonen; Tampere University of Technology, Finland
Markku Lampola; Tampere University of Technology, Finland
Clas-Håkan Nygård; Tampere University of Technology, Finland

The current debate on the university invention ownership model claims that the famous Bayh-Dole act-based model is likely not the best option, as the results are very controversial. Different models have been proposed to determine better ways of supporting societys development. This paper investigated a promising university research-based invention and identified challenges encountered on the road towards its invention. The term invention is used in this paper to refer broadly to research results protected and owned through patents and/or copyrights. This terminology reflects the fact that, in Finland and probably many other countries as well, more and more commercially exploitable research results, such as software and databases, fall into the category of copyright material. Although copyright and patent regimes indicate different legal frameworks for university ownership, Finnish universities to a large extent apply the same principles. University patent ownership is facilitated by the University Invention Act and copyright ownership through corresponding rights transfer agreements between the university and the researcher. Theoretically, this paper attempts to contribute to the on-going discussion on different invention ownership models by showing via an in-depth case study what kinds of challenges are to be expected when preparing an invention for market introduction.

TB-06 Technology Management in Defense Industry - 1
Tuesday, 7/20/2010, 10:00 - 11:30
Room: Arcadia Hall 2

Chair(s) Andre J Buys; University of Pretoria

TB-06.1 [A] Study of Knowledge and Skills in Project Management in the Brazilian Air Force

Manuel A Fagundes Perez; Instituto Tecnologico de Aeronautica, Brazil
Ligia Maria S Urbina; Instituto Tecnológico de Aeronáutica, Brazil
José Henrique S Damiani; Instituto Tecnológico de Aeronáutica, Brazil

The Command of the Brazilian Air Force has a methodology for the development and acquisition of aircraft and aeronautical systems divided into nine distinct phases: design, feasibility, design, development, production, deployment, use, regeneration and deactivation. From the definition phase, once defined the alternative considered for acquisition or development, is designated a team of Project Management. This team will be led by a Project Manager in order to centralize and integrate all activities of the project, establishing the functions of supervision and control of actions. Depending on the complexity for the performance of tasks involving the management, it is difficult to identify the knowledge and skills for this role with the necessity of multidisciplinary knowledge. This article seeks to identify the knowledge and skills that an Air Force officer should have to fill this function, thereby making possible the development of academic and practical skills before the advent of this demand. Another focus of this paper is the possibility of development of skilled human resources, allowing these features do not interfere with the success of the project.

TB-06.2 [R] Evaluating the Military's Technology Absorptive Capacity

Jaco Jacobs; University of Pretoria, South Africa
Andre J Buys; University of Pretoria, South Africa

The Department of Defense, in light of the rapid advances in military technologies, requires continuous evaluation of the processes, structures and policies that facilitates the transfer of advanced technologies to end-users. It further requires an evaluation of the readiness of the end-users and their ability to exploit these technologies to provide them with a competitive advantage in combat. The questions are asked: Are the end-users ready to absorb the new technology? Are the end-users able to exploit the new technology to achieve combat superiority? These questions were addressed through the evaluation of the absorptive capacity of the South African military at a particular point in time. Literature showed that the absorptive capacity construct was built on three dimensions: ability to evaluate new knowledge, ability to assimilate the knowledge, and the ability to exploit the knowledge. These dimensions were subsequently expanded to four and formed the foundation for a new method of evaluating the absorptive capacity of the military. This paper will show the results of the study where the method was used to evaluate the absorptive capacity of the South African military.

TB-06.3 [A] Defense R&D Technology Valuation Model with Income Approach

Won-Joon Jang; Defense Agency for Technology and Quality , Korea, South
Choon-Joo Lee; Korea National Defense University, Korea, South

According to the Korean government's defense policy, "New Economy Growth Motives of Defense Industries," the relevant bodies set up the objective, "The Defense Export over 3 billion dollars until 2012" and continue to make the effort to reach this goal today. Therefore, the defense technology valuation is going to be a key issue for the domestic defense R&D of equipment including main battle tanks, armored vehicles, air fighters and so on. This paper presents the defense R&D technology valuation model with in-depth analysis of its theories and current status both domestically and abroad. Also, it provides relevant policy issues and direction in the near future. It should firmly contribute to boosting the defense technology valuation fields and to formulating a concrete tool for analyzing defense R&D technology valuation in the near future.

TB-06.4 [R] Technology Acquisition Policy and Value Efficiency Analysis on Offsets in Defense Trade

Choon-Joo Lee; Korea National Defense University, Korea, South
Bong-Kyoo Yoon; Korea National Defense University, Korea, South
Hyuck Kim; Korea National Defense University, Korea, South
Won-Joon Jang; Defense Agency for Technology and Quality, Korea, South

Offsets trade is an essential part of all defense contractual arrangements. And each year, around $55 billion worth of arms sales are agreed and $120 billion value of defense offsets is executed. Defense offsets are involved with acquisition policy mainly for the high-tech acquisition of importers. And sellers exploit further chances of business interests. The paper reviews the offsets trends and policy measures of the selected countries and compares the value efficiency of offsets among the nations that received offsets value from US. And it tries to analyze the efficiency gaps among the nations to derive the policy implications in terms of the possible influential factors.

TB-07 Technology Management in Semiconductors Industry - 2

Tuesday, 7/20/2010, 10:00 - 11:30
Room: Lagoon Hall 1
Chair(s) Charles M Weber; Portland State University

TB-07.1 [R] Innovation Spillover Effect in Semiconductor Industry

Bi-Huei Tsai; National Chiao Tung University, Taiwan

The contribution of external intellectual property development by other firms to firms internal innovation and productivity improvement is defined as the spillover effect. While some criticize that the intellectual property right protections on patents hinder the spillover effect, others propose that the compulsory patent disclosure or patent licensing enforces innovation spillovers. This paper thus provides the empirical evidence of patent and R&D spillover effect on productivity to resolve the controversy. The findings support that the spillover effect derived from other companies innovative activities can enhance firm process or product innovation, thereby improving firm performance. Since technology learning from intra-industry R&D activities or patent development is swiftly facilitated for IC firms involved either in process innovation or in product innovation, R&D spillover effects in these firms appear evidently stronger. In contrast, because the IC firms rely more on patent licensing to develop core technology innovation, the patent spillover effect is obvious as well.

TB-07.2 [R] The Evolution of Knowledge Spillover and Assignee Cluster in Semiconductor Industry

Chun-Chieh Wang; National Taiwan University, Taiwan
Dar-Zen Chen; National Taiwan University, Taiwan
Mu-Hsuan Huang; National Taiwan University, Taiwan

Because of technology-driven and capital intensive characteristics of the semiconductor industry, it is significant but arduous for most companies to proceed by themselves with technology development and innovation. It is clear that innovation can be regarded as an interactive process, which requires collaborative relationships among different agents of the processes. Thus, the goal of this study is to scrutinize and characterize the dynamic evolution of involuntary knowledge spillover (patent citations among assignees) and voluntary knowledge spillover (assignees as joint owners/co-assignees) in this industry. By using United States patents divided into three periods (six-inch, eight-inch and twelve-inch microchips), the researchers of this study have discovered that the patent growth of this industry has been significant over the period of time from 1997 to 2004. The Core Actor included seven assignees with higher knowledge in/out flows in both the eight- and twelve-inch periods, such as the enterprises of AMD, IBM, Intel, Micron Technology, Samsung Electronics, TSMC Taiwan, and Toshiba. Among 11 assignee clusters across eight- and twelve-inch periods formed by co-assignees with the voluntary knowledge spillover, there were nine clusters, which were all Japan assignees, suggesting closer relationships existing in the field of this industry in Japan.

TB-07.3 [A] Synchronizing Innovation: The Case of Semiconductor Lithography

Patricia Gabella; SEMATECH, United States
Charles M Weber; Portland State University, United States

This paper explores the timing of the next generation semiconductor lithography supply chain in relation to the semiconductor device invention, development and delivery timing. The authors suggest that there is a drum beat that drives this timing. This paper will discuss this drum beat methodology and how it affects the organization, the supply chain and the industry. This synchronization may also affect ancillary industries.

TB-08 Supply Chain Management - 1
Tuesday, 7/20/2010, 10:00 - 11:30
Room: Lagoon Hall 2
Chair(s) Siri-on Setamanit; Chulalongkorn University

TB-08.1 [R] Strategic Planning and Performance Improvements of Global Supply Chain with Network Design Optimization Tool

Ake Tonanont; The University of Texas at Arlington, United States
Sanya Yimsiri; The University of Texas at Arlington, United States
Jamie Rogers; The University of Texas at Arlington, United States

These days, many companies have customers around the world. This globalization requires better supply chain performance. The design of an optimized network supply chain model is very important to help save costs and gain profit. A good network design tool can help firms optimize their supply chain in a timely manner, also saving substantial costs. In this research, we develop a series of case studies for use with a network design optimization tool. These case studies are proposed to be used as a classroom learning aid in university level supply chain courses for both strategic planning of new supply chain networks and tactical performance improvement of existing supply chains. Results of the global network supply chain design case studies with various scenarios will be discussed.

TB-08.2 [R] Using Simulation to Explore the Impact of Inventory Policies on Supply Chain Performance

Siri-on Setamanit; Chulalongkorn University, Thailand

To survive in todays competitive environment, companies need to improve customer service while reducing costs. One way to address this challenge is to effectively and efficiently managing inventory. Companies carry inventory to ensure the level of customer service and avoid lost sales. However, holding inventory comes with costs such as inventory carrying cost and opportunity cost. There are several inventory policies proposed in the literature which aim to manage the difficult trade-off between minimizing the costs of holding inventory and satisfying customer demand. Unfortunately, these policies tend to be generic and work well under assumptions. Some assumptions may be contradicted by real-world practice, for example, stable and deterministic customer demand. In addition, certain policies that work well in one industry may not be appropriate for other industries under different environments. As a result, there is a need to develop a simulation model to determine a suitable inventory policy and explore the effect of inventory policy on supply chain performance, including cost and service level (fill rate) for a particular company or supply chain. In this paper, a case study of a beverage distribution center was used to illustrate the use of simulation to identify the most suitable inventory policy. Simulation model and simulation optimization can serve as guiding tools to develop appropriate inventory policy. Furthermore, experimenting with the simulation model can also help managers to understand the effect of change in environment/condition on the effectiveness of the inventory policy.

TB-08.3 [A] Optimizing New Chain Retail Store Area by Using Voronoi Diagram Technique

Wen-Hsiang Lai; Feng Chia University, Taiwan
Kei-Zhang Hung; Feng Chia University, Taiwan

This study probes into a large-scale retail chain store in the central business district (CBD) and discusses how chain stores avoid competitors and their own market fields to explore availabilities of commercial opportunity and economic development. This study adapts Voronoi diagram technique, which is applied as a new method in the field of technology management, in order to optimize the selection of new locations. In this study, the concept of center place theory (CPT) provides an important value for studying industrial market development of Voronoi technique using geographic information system (GIS). This study constructs an algorithm to optimize the decision-making in the selection of a new chain store location. According to the literature reviews, the three most important factors affecting the decision-making of selecting a new location for stores are transportation, population, and site. It is necessary to calculate the optimal service ranges and conduct the comprehensive analysis of weighted Voronoi diagram (WVD) for these three critical factors. The biggest weight in WVD is chosen in this study as the general goal area of a new chain location, and then using the concept of Cone of Influence to find a smaller area for the specific store location within the WVD areas. This optimized new store location should be the ideal selection for business development of large-scale retail chain stores.

TB-08.4 [R] Advanced Decision Support Tool by Integrating Activity-Based Costing and Management to System Dynamics

Amir H Khataie; Concordia University, Canada
Akif A Bulgak; Concordia University, Canada
Juan J Segovia; Concordia University, Canada

In todays global and competitive business environment, cost control and cost management have become a decisive variable in the firms financial success. This requires reliable tools and techniques to estimate business expenses and enhance the understanding about business operation costs. The ultimate reason for firms to adopt activity-based costing and management (ABC/M) is to manage and control their costs, to reduce them, and thus to improve their financial performance. Several studies have proven the capability of ABC/M in generating valuable cost information in supply chain management and production problems. The ABC/M advantages can be utilized as well in developing system monitoring, controlling, and analyzing tools. A prevailing decision support and monitoring system should analyze and project the effect of each change in the business operation environment. System dynamics (SD) is an approach to investigate the dynamic behavior in which the system status alterations correspond to the system variable changes. This paper is a pioneer in introducing a general approach of integrating ABC/M information with SD simulation modeling technique, which results in a more reliable and responsible decision support system. This new tool will enhance cost monitoring and cost control in supply chain management and production process.

TD-01 Technology Roadmapping - 1
Tuesday, 7/20/2010, 13:00 - 14:30
Room: Ballroom A
Chair(s) David Raffo; Portland State University

TD-01.1 [R] Roadmapping the Future of Sustainable IT

Robert R Harmon; Portland State University, United States
Tugrul U Daim; Portland State University, United States
David Raffo; Portland State University, United States

Over the past decade, IT organizations have increasingly embraced the notion of incorporating sustainable business practices into the design and operation of information technology products and systems. Initial efforts focused on enabling the more efficient use of computing resources in terms of reducing energy consumption and its corresponding carbon footprint. The reduction of computing-centric energy use in data centers and throughout the firm summarizes the first wave of sustainable IT, often called green IT. However, the emerging second wave will be much more difficult for IT managers to define and successfully navigate. IT products and services have become ubiquitous in developed countries and are being rapidly adopted in emerging economies. Information technology has become highly visible in terms of it benefits and its costs to society. The future of sustainable IT will be driven by government regulation and changes in market requirements. Proactive IT managers need to get ahead of this curve by developing effective market, product/service, technology and organizational roadmaps to achieve sustainable IT leadership. This will likely require IT organizations to move beyond narrow operational requirements and embrace a more strategic role as a key enabler of corporate sustainability and social responsibility efforts. This paper will explore the strategic dimensions and drivers of sustainable IT and

roadmap its likely development as a disruptive revolutionary force over the next decade as it moves beyond the datacenter and throughout the IT organization, the firm, markets, and society at large.

TD-01.2 [R] A Bayesian Belief Network Approach to Operationalization of Multi-Scenario Technology Roadmap

Changyong Lee; Seoul National University, Korea, South
Bomi Song; Seoul National University, Korea, South
Yangrae Cho; Seoul National University, Korea, South
Yongtae Park; Seoul National University, Korea, South

The strategic importance of business and technology planning has been highlighted in the era of growing uncertainty in which markets shift rapidly and new technologies proliferate unlimitedly. In this respect, among others, multi-scenario technology roadmap has been one of the most frequently adopted tools. Despite all the possibilities offered by the multi-scenario technology roadmap, however, it is subject to limitations that stem from difficulties in operationalization. The vital requisites for operationalizing the multi-scenario technology roadmap are to deal with it as a complex process comprised of interrelated activities and to select the most appropriate migration path for given scenarios. The tenet of this study is the requisites can be achieved through the Bayesian belief network (BBN). The distinct strengths of BBN, vis-a-vis others, lie in modeling and analyzing a complex problem that is characterized by direct/indirect effects and uncertainty. Specifically, a network topology of the BBN is first constructed based on the multi-scenario technology roadmap. The causal relations are then derived by pairwise comparisons. Finally, in-depth analysis is carried out to obtain the fitness of individual migration path for given scenarios. The proposed BBN approach is expected to help organizations to overcome the challenge of keeping a technology roadmap alive by improving its analytic power.

TD-01.3 [R] Roadmapping for Educational Technology Services: Expanding Educational and Research Capabilities at Higher Education Institutions

Andre L Fleury; Universidade de Sao Paulo, Brazil
Guilherme Ary Plonski; Universidade de Sao Paulo, Brazil
Alesssandra Z Dahmer; Fundacao Instituto de Administracao, Brazil
Gilson Schwartz; Universidade de Sao Paulo, Brazil

This paper presents a framework for planning and implementing new educational technology services at higher education institutions, aligned with their strategic objectives and in accordance with their technological planning. Its main characteristics are flexibility, simplicity, and iterative. The proposed framework customizes the technology roadmapping approach to analyze educational trends, identify educational technology services and determine the required technological capabilities. Based on the roadmapping results, portfolio management techniques are applied to identify the most relevant portfolio of educational technology services for the organization. Finally, with the use of software development concepts and techniques, service designs are transformed into fully operational services. Obtained results are analyzed using three complementary perspectives: human resources perspective, technological perspective, and methodological perspective.

TD-02 Decision Making - 2
Tuesday, 7/20/2010, 13:00 - 14:30
Room: Ballroom B
Chair(s) Pisek Gerdsri; Portland State University

TD-02.1 [A] A Novel MCDM Combining DEMATEL Technique for Technology Evaluation

Yung-Chi Shen; National Chiao Tung University, Taiwan
Grace Lin; National Chiao Tung University, Taiwan
Gwo-Hshiung Tzeng; Kainan University, Taiwan

This research aims to propose a hybrid process concerning the complex interactive relationship between different economic and industrial prospects towards a more effective evaluation of new technology. To achieve this purpose, the integration of the Decision Making Trial and Evaluation Laboratory (DEMATEL) technique and the analytic network process (ANP) is employed to construct a technology evaluation model regarding the economic and industrial prospects. The emerging organic light emitting diode (OLED) display technology is used as a case in order to verify the applicability of the proposed novel hybrid MCDM method for the technology evaluation. The result of this hybrid process can help top managers of technology-based companies or policy makers of governments to more objectively and effectively determine a future research and development direction.

TD-02.2 [R] A Fuzzy Integral Based FMCDM Framework for Semiconductor Foundry Strategy Definitions at Various Stages of a Technology Life Cycle

Chi-Yo Huang; National Taiwan Normal University, Taiwan
Chao-Yu Lai; National Taiwan Normal University, Taiwan
Gwo-Hshiung Tzeng; Kainan University, Taiwan
Huei-Ling Chen; National Taiwan Normal University, Taiwan

Semiconductor foundry manipulation is one of the most important core-competences of fabless integrated circuit (IC) design firms. However, it is not easy for a fables IC design firm to select appropriate foundry strategies versus each stage of a technology life cycle (TLC). To satisfy multiple goals of time to market, profit maximization and quality assurance, fabless IC design firms should choose appropriate foundries at various stages of a TLC. Albeit important, very little research discusses how appropriate foundries can be determined. Thus, this research aims to develop a fuzzy integral-based fuzzy multiple-criteria decision-making (FMCDM) framework. Considering the characteristic of inter-dependences between criteria, a non-additive fuzzy integral-based FMCDM model will be proposed for assisting decision makers in evaluating the most appropriate foundry strategies. An empirical study based on evaluating appropriate foundry strategies will be leveraged to demonstrate the feasibility of the proposed fuzzy integral-based FMCDM framework. Criteria for evaluating and selecting foundries over a TLC will be derived based on experts opinions. Meanwhile, an empirical study of the selection of foundry strategies by a PC chipset fabless design firm will be leveraged for verifying the feasibility of the proposed FMCDM framework. The result is satisfactory. Meanwhile, the proposed framework can be leveraged for selecting appropriate foundry or provider strategies over a TLC.

TD-02.3 [A] Analyzing Multi-criteria Decision Tools: A Comparative Test among Countries from the Perspective of Technologic Potential through the Application of AHP, Fuzzy and SWOT Methods

Erika K Ikeda; Sao Paulo University, Brazil
Robson P Alves; Sao Paulo University, Brazil
Tamio Shimizu; Sao Paulo University, Brazil

The objective of the paper is to evaluate the singularities, complementarities and results of three types of multicriteria decision analysis: AHP, Fuzzy and SWOT to classify the growth of emergent countries like Brazil, Russia, India and China and developed countries like United States, Germany and Japan, emphasizing the technologic potential of these countries in the future years. The main variables were chosen, prioritized and suffered pairwised comparison using historical data and regression analysis from 2000 to 2010. Each method was applied for each country's data, using software to speed up the execution of the analysis. Besides the robust classification of the countries, indicating that better decisions and trend analysis of multiple variables can be made using combined use of the methods, it can be extended for many complex decision making processes.

TD-02.4 [R] System Dynamics Analysis of the Formation of Corporation Network

Xijun He; Beijing University of Technology, China
Yu Liu; Beijing University of Technology , China
Yuying Wu; Beijing University of Technology, China
Feng Yan; Beijing University of Technology, China

We analyze the internal causes and external causes of the formation of corporation network by system dynamics. First, we provide a flowchart of corporation network operation.

Secondly, we simulate the characters and rules of the formation and operation of corporation network by Vensim. Thirdly, we conclude that the corporation network will form and maximize its efficiency under the effect of an organizations internal restriction and external environment. The network culture, the network coordination degree and the technology innovation have great effects on the network efficiency, but the change of market is not so closely relevant to it.

TD-03 Social Network Analysis - 1
Tuesday, 7/20/2010, 13:00 - 14:30
Room: Similan 1
Chair(s) Charles M Weber; Portland State University

TD-03.1 [R] Social Network Analysis of Directors and Supervisors in Taiwan Semiconductor Industry

TA-Shun Cho; National Chi Nan University, Taiwan
Hsin-Yu Shih; National Chi Nan University, Taiwan
Ling-Ching Yang; National Chi Nan University, Taiwan

Using social network analysis, this paper examines whether a network pattern of appointed directors and supervisors exists among high-tech firms based on a case of Taiwans semiconductor industry and the primary strategies of coordination and control occur through network relationships of directors and supervisors. Furthermore, a high-tech firm can have access to a wide variety of knowledge and control the flow of information by network attribute of visibility and strategic position. The empirical study presents an exploratory research for evaluating social network analysis of appointed directors and supervisors among Taiwans 55 listed semiconductor firms, which offers the indicators of degree and betweenness centrality with corresponding network attributes of visibility and strategic position. Moreover, the network attributes of the firm itself are examined for interactive relationships with the firms profit and R&D capability by Pearson correlation. Finally, four propositions derived from the empirical results provide insights and implications through network relationships of appointed directors and supervisors in the semiconductor industry for enriching the existing literature on interlocked directors.

TD-03.2 [A] E-mail Network Analysis as a Technology Management Tool

Hisato Tashiro; The University of Tokyo, Japan
Junichi Mori; The University of Tokyo, Japan
Nobuzumi Fujii; Waseda University, Japan
Kiyoshi Suzuki; Gunma University, Japan
Katsumori Matsushima; The University of Tokyo, Japan

For technology and innovation management, it is critical to identify communities and deploy informal leaders. In our recent studies we demonstrated our method was effective to identify informal technological communities and potential leaders from email data within an organization and with chronological data, a formal organization was evaluated with informal communities before and after major organizational changes. In this paper we apply our method to evaluate the formal technology groups through a case study in a global manufacturing company. We collect two sets of one-month email log, construct an email network, identify communities in the email network by performing a topological clustering of networks, calculate degree centrality, betweenness centrality, closeness centrality, and pagerank centrality to identify leaders, and compare them against formal technological communities of practice activities. Our method helps management systematically view its organization as a whole by using email network analysis. At the same time, the analysis can be used to evaluate communication of interactions among the members. It also helps propose effective CoP and candidates of leaders acting as a hub of information channel of the communication network.

TD-03.3 [R] Analyzing Social Networks Characteristics

Lee Ye; The University of North Carolina at Chapel Hill, United States
Bahn Kasemsarn; Naresuan University, Thailand

This paper describes social networks by exploring certain Internet computer networks and their relationship to social networks. These networks are valuable for communication, file transfer and remote computer usage, and we show how social networks present similar characteristics under certain conditions. This exploration provides a great way to simulate and explore social networks by better understanding of the relationship between entities and the human behavior that creates them.

TD-04 Intellectual Property - 1
Tuesday, 7/20/2010, 13:00 - 14:30
Room: Similan 2
Chair(s) Bi-Huei Tsai; National Chiao Tung University

TD-04.1 [A] Chinese Company's IPR Strategy: How Huawei Technologies Succeeded in Dominating Overseas Market by Sideward-Crawl Crab Strategy

Yutaka Nakai; Tokyo Institute of Technology, Japan
Yoshitoshi Tanaka; Tokyo Institute of Technology, Japan

Chinese companies are expanding their patent applications. Having been a licensee of intellectual property rights for a long period of time, they are trying to transform themselves as creators of their own technologies and patents. Their purposes are to escape from the status that their R&D is dominated by patent of MNEs overseas and avoid payment of license fee. In this paper, we take Huawei Technologies as an example, to follow its path to becoming one of the worlds biggest patent applicants and one of Chinas largest IT companies. Its strategies are: 1) focusing on peaked-out technologies and providing abundant output, 2) supplementing its technologies and patents by collaborating with its rival company and by M&A, and 3) targeting markets in developing countries in order to establish de facto standards. The companys strategy and success traced a different path from other developing countries methods. In this thesis, we call it Sideward-Crawl Crab Strategy and present the way for developing countries companies at the beginning stage to develop and win among dominant MNEs.

TD-04.2 [R] Correlation between Standardization and Innovation from the Viewpoint of Intellectual Property Activities: Electric Machine Industry and All Organizations in Japan

Suguru Tamura; Waseda University, Japan

This paper examines the statistical correlation between standardization and innovation in companies and research institutions in Japan. Knowledge of the number of persons who engage in standardization-related activities (PSRA) and the number of patent applications is required in order to investigate the statistical correlation. However, it has been difficult to count the number of PSRA in actual organizations directly. To circumvent the difficulty, this research pays attention to the number of persons who engage in intellectual property-related standardization activities (PIPRSA). The consideration of whether the number of patent applications in Japan shows a positive correlation with PIPRSA is presented and discussed. It was found in the case of the Japanese electric machine industry that there is a significant positive relationship between innovation and standardization.

TD-04.3 [R] Analysis of Patent and Profitability in Taiwan Semiconductor Firms

Bi-Huei Tsai; National Chiao Tung University, Taiwan

This investigation seeks to ascertain the relevance between firm profitability and innovation. This paper regard granted patent as the indicator of innovation. Next, we further explore how the company size, export ratio and research and development ratios (R&D ratios), patent infringement lawsuits affect firm innovation. The impact of lawsuits on innovation is investigated in terms of the following aspects. First, this investigation empirically explores the relations between granted patent number and corporate profitability. Second, this paper empirically analyzes whether the plaintiffs file the patent infringement lawsuits to protect their property rights, so the patent infringement accusation lawsuits force enterprises to concentrate on intellectual property rights. This paper employs 59 integrated-circuit (IC) design firms, 11 IC manufacturing firms and 17 IC packaging and testing firms from 2001

to 2006 in our sample. The results exhibit that the rate of return on asset is higher for firms which hold more granted patents. In particular, Taiwan granted patent number dominates firm profitability. In addition, both company size and R&D ration are positively related to the innovation ability. Also, we find the rapid growth of Taiwan and U.S. granted patents after patent infringement lawsuits. It implies that such litigations enforce enterprises to be involved in R&D activities. Particularly, the patent growth is found to be substantially greater for the defendants than the plaintiffs. To refute the charge and defend corporate competitiveness, firm managers will enhance patent development after the patent infringement accusations. Thus, the innovative ability of these firms becomes superior and more patents are successfully developed.

TD-04.4 [R] Survey about Potential Effects of the Brazilian Innovation Law in the UTFPR Conclusion Graduations Projects

Vivian A Czelusniak; Universidade Tecnológica Federal do Paraná, Brazil
Dario A Dergint; Universidade Tecnológica Federal do Paraná, Brazil
Luiz O Pimentel; Universidade Federal de Santa Catarina, Brazil
Kazuo Hatakeyama; Universidade Tecnológica Federal do Paraná, Brazil

Recent innovation models such as Open Innovation show a scenario that interactions between universities and companies can be important channels for stimulating innovation. Thus, the university patenting rights are regulated in many countries inspired by Bayh-Dole, to legitimize the interactions between the actors. However, according to studies carried out by the universities, the ownership of intellectual property has brought both positive and negative consequences for the interaction between universities and companies in some countries like the USA and Denmark, for example. In this scenario, this paper proposes a methodology to assess obstacles to realize the process of technological innovation of the UTFPR conclusion graduations projects by the perspective of Brazilian Innovation Law. A survey was administered for students in the undergraduate course in electronic engineering/telecommunications. The results stand out a little interaction between the project of undergraduate students at the UTFPR with companies and industries and the fact that the main difficulty for the innovation of these projects are in the technology transfer process. Thus, we conclude that the Brazilian Innovation Law (Law number 10,973/2004) can be an important tool for structuring a body to stimulate innovation from universities projects.

TD-05 New Venture Management - 1
Tuesday, 7/20/2010, 13:00 - 14:30
Room: Arcadia Hall 1
Chair(s) David Wilemon; Syracuse University

TD-05.1 [R] Can University Spinoffs Acquire Managers from Industry? Empirical Analysis of Technology Management by Universities on Performance of the Spinoff Ventures

Yuri Hirai; The University of Tokyo, Japan
Toshiya Watanabe; The University of Tokyo, Japan

University spinoffs usually utilize technologies that are created by basic research. Therefore, they need to manage their early technologies in order to adopt them to market. However, in many cases, university spinoffs hire universities researchers that are out of touch with business. Hence, for their success, it is important that business experts commit them and they manage technologies properly. The aim of this paper is to clarify whether not only the organizations internal factors of spinoffs but also external factors such as alliance management by mother universities affect their performance. We conducted regression analysis using questionnaire surveys on Japanese university spinoffs and their mother universities. We utilized the number of policies and rules of universities as independent variables to represent university-industry collaboration policy and intellectual property policy along with organizational factors of spinoffs. Dependent variables are whether the spinoffs acquire managers from industry. As a result, it is revealed that a strong university-industry collaboration policy of the mother university is a significant variable to affect positively on acquiring managers from industry, while strong IP policy is a significant factor to affect on it negatively. The results suggest the importance of the accessibility to resources outside of universities.

TD-05.2 [R] Organizational Legitimacy and Resource Acquiring in New Venture: The Case of Organic Food Social Enterprises

Yann-Jy Yang; National ChengChi University, Taiwan

Most new ventures suffer from the liability of newness. They usually have limited resources to compete effectively against established organizations, so they need external resources for their survival and growth. However, the ventures with high organizational legitimacy may overcome the predicament. Sometimes, legitimacy is a means to catch gatekeepers eyes if ventures address one norm or social value fitting those gatekeepers. Little in the literature provides empirical evidence about the relationship between survival and legitimacy of organizations. Nevertheless, the research about how new ventures get their benefit from legitimating activities is seldom to be studied. This study proposes four types of legitimacy, which are regulatory, normative, pragmatic, and cognitive legitimacy alternately, for new ventures' survival and growth. It also analyzes the influence for their entrepreneurial network members. The case study methodology, inductive study of two organic food shops, is used. It finds that legitimacy is useful obviously for new ventures to get resources from exterior organizations, when the claim of legitimating activities is similar to the faith of cooperate partners. The stakeholder either does or does not support the new ventures after observing the legitimacy-management activity, but it all depends. Diverse perceptions and reactions of the stakeholders of two ventures emerge consequence to the slight difference of the claims. The entrepreneurial network which the claim of ventures is directly bonded with some members will grow slower than one without. Moreover, the new venture which the legitimacy-management actions are comprehensive or not relative to any members will gain high legitimacy, and its entrepreneurial network may grow rapidly.

TD-05.3 [A] Application of High Performing Systems Theory to Corporate Venture Teams

David Wilemon; Syracuse University, United States

The purpose of this presentation is to examine the potential application of Peter Vaills definition of high performing systems (The Purposing of High Performing Systems, Organizational Dynamics, Autumn 1982) to corporate venture team management. Vaill argues that high performing human systems contain three major qualities, namely, the ability to focus on the key success levers of an organization, feelings (personal commitment), and the investment of time/ personal continuing presence. In this presentation high performing human systems will be explored in depth with special emphasis on their major characteristics. Special attention will be focused on strengths and limits of these systems. The consequences to performance and the systems participants are explored when one or more of the three major components (focus, time, or feelings) are absent. The presentation then addresses corporate venture teams and how they function within their larger host organizations. We then suggest how Vaills concept of high performing systems can be used in managing and assessing corporate venture teams. Implications for the organizational sponsors of venture teams are discussed as well as several areas for future research.

TD-06 Education - 1
Tuesday, 7/20/2010, 13:00 - 14:30
Room: Arcadia Hall 2
Chair(s) Caroline F Benton; University of Tsukuba

TD-06.1 [R] Technology-Mediated Learning Across Borders: A Cross-Cultural Case-Study

Remy Magnier-Watanabe; University of Tsukuba, Japan
Caroline F Benton; University of Tsukuba, Japan
Harald Herrig; Grenoble Ecole de Management, France
Olivier Aba; Grenoble Ecole de Management, France

E-learning has entered the mainstream in higher education, and many institutions are implementing technology-mediated learning at some level. However, many researchers have found that matching the meaningful interactions evident in traditional classrooms is a

challenge still unresolved. This paper outlines an example of a course taught jointly in 2010 over three months by two graduate programs in management at the University of Tsukuba in Japan and the Grenoble Ecole de Management in France through a video-conferencing system and other ICT tools. The authors used a hybrid style of e-learning that was aimed at increasing collaboration among instructors and students remotely located. This research first reviews the existing literature and practice of e-learning of graduate programs along with their shortcomings and merits, and analyzes a pilot course taught last year. We also present the results of a questionnaire survey of students during the course and provide practical recommendations for developing and managing a hybrid course balancing the positive aspects of e-learning with the benefits of face-to-face instruction, while suiting the participants cultural learning idiosyncrasies.

TD-06.2 [A] Achieving Quality, Excellence, and Consistency in a Global Academy

Peter E Maher; Webster University, United States
Janet L Kourik; Webster University, United States
Benjamin O Akande; Webster University, United States

Webster University, a multi-campus, multi-national university, recently obtained specialized business accreditation from the Association of Collegiate Business Schools and Programs (ACBSP) as well as institutional re-accreditation from The Higher Learning Commission (HLC). The journey towards these successes centered on ensuring the quality and consistency of curricula, an especially monumental task given Webster's global profile. With multiple campuses throughout the world, over 1500 practitioner faculty, and a variety of commonly used delivery formats, the challenges initially appeared daunting. The Consistency Project was initiated to address the issues faced in ensuring that curricula are communicated clearly to instructors world-wide. While actively celebrating the academic freedom of faculty, comparable coverage in courses regardless of location had to be fostered. The journey leading to the implementation of the Consistency Project, and towards accreditation, uncovered many obstacles. Our journey has of course not ended, but has resulted in a highly consistent, quality set of programs being delivered throughout the world of Webster. We have identified several key benefits including: improved communication, progress towards a cohesive university, more consistent programs, repositories and analysis mechanisms for assessment data. Moreover, the Webster culture among both faculty and staff is now more pro-assessment and accepting of the benefits of accreditation.

TD-06.3 [A] Engineering and Technology Management Education: Faculty and Students RISE to the Challenge

Stephen P Hundley; Indiana University-Purdue University Indianapolis, United States
Patricia L Fox; Indiana University-Purdue University Indianapolis, United States
D. Jan Cowan; Indiana University-Purdue University Indianapolis, United States
Connie L Ely; Indiana University-Purdue University Indianapolis, United States

Engineering and technology management professionals increasingly find themselves living and learning in a world characterized by the need to solve unscripted problems, work in globally interconnected environments, help to improve the conditions of disadvantaged citizens, and translate theory into practice. All too often, however, the education of engineering and technology management students fails to adequately equip them with the knowledge, skills, experiences, and perspectives necessary to meet such needs. In addition to discipline-specific knowledge, there exist several innovative pedagogies faculty can employ to better prepare engineering and technology management students to meet the present and emerging realities of the profession. At our institution, such approaches are organized and branded around an engaging educational framework known as RISE: research experiences for undergraduates; international study abroad programs; service learning; and experiential education. This paper discusses the development and implementation of RISE; faculty and student buy-in and support for this approach; alignment with professional standards; interventions to make RISE meaningful, scalable, and sustainable; and approaches for assessing, evaluating, and improving student learning outcomes. Lessons learned, successful strategies, pitfalls to avoid, suggestions for replication in other contexts, and implications for stakeholders will be shared.

TD-06.4 [R] Performance Evaluation of Universities in China Based on ESI Database

Yan Cao; Institute of Scientific and Technical Information , China
Hefeng Tong; Institute of Scientific and Technical Information , China
Jie Yu; Institute of Scientific and Technical Information , China
Dar-Zen Chen ; National Taiwan University, China
Mu-Hsuan Huang; National Taiwan University, China
Xu Zhang; Institute of Scientific and Technical Information , China
Yong Luo; Institute of Scientific and Technical Information , China
Yun-Hua Zhao; Institute of Scientific and Technical Information , China
Ze-Yu Zhang; Institute of Scientific and Technical Information , China

The research performance of universities in China is evaluated in this study from the global perspective. Based on the Essential Science Indicators (ESI) database, this research mainly concerns the academic output in overall publication activity and the influential strength of certain disciplines of selected universities. Different types of bibliometric methods are applied in this study, including publication output and impact indicators. Some basic bibliometric indicators, such as number of papers, number of citations, average citation rates, and number of highly cited papers, are obtained from ESI. The other three indicators are yielded from more complicated calculation in order to comprehensively interpret academic performance of selected universities. The overall research performance and the superior disciplines of these universities are revealed in this study, and the authors also compare the outstanding academic disciplines with their so called National Key Disciplines that the universities prioritize. The results show that there is a considerable gap between quality and quantity of research output of the universities in China. Meanwhile, a large degree of research influence concentrates on some specific disciplines of selected universities.

TD-07 Technology Management in Telecommunication Industry - 1

Tuesday, 7/20/2010, 13:00 - 14:30
Room: Lagoon Hall 1
Chair(s) Kumiko Miyazaki; Tokyo Institute of Technology

TD-07.1 [R] Delphi Method Analysis: The Role of Regulation in the Mobile Operator Business in Finland

Kimmo Laakso; Tampere University of Technology, Finland
Anita Rubin; University ofTurku, Finland
Hannu Linturi; Metodix, Finland

Mobile communication has grown out of its original scope and scale. Mobile operators have played a significant role in this phenomenon. Since the mobile operator business is highly regulated, the effects of regulation on the industry have been analyzed. The potential effects in the years up to 2015 are also considered. The aim of this paper is to discuss the possibilities of a futures-oriented method, i.e. the Delphi method, to estimate the effect of regulation on the mobile operator business. The challenge is that the method was originally created to assess experts' opinions about the course of development of a certain technology or phenomenon in the future and then, by using a scenario technique, to draw conclusions about its possible futures. Now the Delphi method is also being used to estimate past development, i.e. experts' opinions of the causes and effects of laws and other regulations in the past few decades. The paper forms a part of a larger study, the aim of which is to analyze the effects of changes in the regulatory framework for the mobile operator industry in Finland. According to this research the ultimate goals of the regulator, set as early as in the middle of the 1980s, have been actualized: In Finland there are several competing nationwide mobile operators and the use of mobile phones is cheap compared to many other countries.

TD-07.2 [R] Does Technological Standardization Enhance or Inhibit Firm's Capabilities? Research on Dynamic Capabilities in the Mobile Communication Market

Hsiao-Chen Mei; National Chi-Nan universitiy, Taiwan
Joseph L Che; National Chi-Nan university, Taiwan

Shihmin Lo; National Chi-Nan university, Taiwan
Peter J Sher; National Chi-Nan university, Taiwan

The mobile communication market presents drastically technology changes from the first generation (1G), second generation (2G), third generation (3G) and next fourth generation (4G) in progress. It is also apparently characterized with the industry standardization, which specifies compatibility and interoperability of the product, with the objective of increasing the efficiency of economic activity. Standardization will convey direct competitive advantage to the owner of the technology. The standard-setting processes result in one of the competitive platforms for expansion and development of a new market. It is interesting that the standards reflect competing and collaborating due to the disclosure and availability assurance of the patents which might be essential to the implementation standards (so-called essential patents). These essential patents simultaneously offer the opportunities to innovation and technology diffusion. We assume that firms will develop technological capabilities through the standards and essential patents. This paper studies the relationship between a firms dynamic capabilities and essential patents through each technology generation, thereby eliciting implications for an optimal role for technological standards in the firms capability deploying and exploring processes, taking mobile communications as an example.

TD-07.3 [R] A Challenge Towards 4G: The Strategic Perspective of Japanese Operators in a Mature Market

Muhammad Suryanegara; Tokyo Institute of Technology, Japan
Kumiko Miyazaki; Tokyo Institute of Technology, Japan

The global economic growth has supported the engine of innovation, leveraging the development of mobile technology from 1G to 2G, 2G to 3G and 3G to the upcoming 4G. This paper attempts to answer the question regarding how Japanese mobile operators (DoCoMo, KDDI and Softbank) have tried to differentiate themselves in regards to mobile technology evolution. We discuss the operators strategic perspective in the 3G era, when the main service has shifted from voice to data and the market is getting mature. In regards to the upcoming evolution towards 4G, we further explore the operators strategic challenges. We develop the analyses based on co-evolutionary perspective between technology, operators and the market. By conducting statistical analysis related to mobile technology generations standards, we reveal the trends and information which benefit the operators for developing their upcoming strategic perspective. The main findings imply that Japanese operators have responded to market and technological changes. They have adopted similar strategies valuing life style applications towards 4G. Operators strategic differentiation has been set in which DoCoMo built an image as the most innovative in lifestyle infrastructure, KDDI emphasized its technical differentiation, and Softbank created an image as the Internet company with the most economic value. The development of mobile technology evolution is showing convergence by concentrating more on data communications. Therefore, a future challenge might be one in which operators make benefit of data services and aggregate lifestyle contents offered to a mature market.

TD-07.4 [R] Asymmetric Regulation for Fair Competition: Focusing on the Impact of the Staggered MNP in Korea

Min-kyoung Kim; Korea Advanced Institute of Science and Technology, Korea, South
Myeong-Cheol Park; Korea Advanced Institute of Science and Technology, Korea, South
Sang-Woo Lee; ETRI, Korea, South

Since 1980, the telecommunications sector monopolistically owned by government faced structural change to the competition regime with the deregulation trend due to rapid growth of demand. But the telecommunications sector has still high entry barriers constructed for a long time. Most regulatory parties worldwide tried to adopt several remedies for fair competition among market leaders and new entrants. In this context, asymmetric regulation has imposed to the significant market player to prevent abusing market power. In the case of the Korean telecommunications service market, asymmetric regulation has strongly implemented to the market leader. The government imposed a mobile number portability (MNP) policy on carriers asymmetrically. Number portability in Korean mobile telecoms has the unique characteristics of the staggered introduction that MNP was gradually adopted for each carrier with time difference of six months. We empirically assessed the performance of the MNP experience in Korea with the social network analysis. As a result, we concluded that the previous staggered MNP, one of the controversial asymmetric regulations, had not contributed to promote the fair competition among carriers based on the analysis of the centrality and multidimensional scaling (MDS). Thus, the Korean regulatory authority needs to adjust the existing rigid asymmetric regulation regime as tentative conclusions for imposing asymmetric remedies in telecommunications.

TD-08 Technology Transfer - 2
Tuesday, 7/20/2010, 13:00 - 14:30
Room: Lagoon Hall 2
Chair(s) Joe Amadi-Echendu; University of Pretoria

TD-08.1 [R] A Case Study on Technology Transfer, Capacity Building and Sustainable Development

Joe Amadi-Echendu; University of Pretoria, South Africa
George Mulamula; Rwanda Development Board, Rwanda

Globalization is triggering significant and rapid developmental changes, thus creating the impetus for emerging economies to evolve towards knowledge-based societies. This evolution is fuelled in part by the transfer of technologies mostly embedded in products and services. It has become a critical challenge for developing countries to build and sustain the capacity for the transfer of information and communication technologies (ICTs) because of the rapid pace of change; and this further exacerbates the challenge of making well-informed policies and appropriate decisions with regard to technology transfer. It is important in this regard to understand what relationships (if any) exist between; (i) technology transfer and sustainable development, (ii) technology transfer and capacity building, and (iii) capacity building and sustainable development. Within the context of a developing country, this paper examines and summarizes a Delphi study of the range of influencing factors for technology transfer, capacity building and sustainable development. The outcome of the Delphi Study forms the basis for further study of possible correlations between the factors of technology transfer, capacity building and sustainable development.

TD-08.2 [R] The Value Added Capability of Innovation Intermediaries in Technology Transaction Markets

Yu-Ju Lo; National Chung-Chi University, Taiwan
Wan-Yu Liu; National Chung-Chi University, Taiwan
Chao-Tung Wen; National Chung-Chi University, Taiwan

As the technology/ patent transaction markets are becoming well-developed, are there professional innovation intermediaries to match the supply and demand sides and to help to accomplish deals? Innovation intermediaries can provide the matchmaking services and increase the connections from outside organizations. This study adopts the case research methodology to examine the intermediary processes for technology patents consulting by the Technology Transfer and Service Center" (TTSC) of the Industrial Technology Research Institute (ITRI) in Taiwan. The purpose of this research is to provide detailed transaction processes of innovation intermediary and technology transactions and to clarify this emerging practice. Finally, we present four value-added capabilities for innovation intermediaries, including technology brokering, IP management, industrial knowledge, and negotiation.

TD-08.3 [R] University Spinoffs as Vehicles for Economic Development: Implementing the Changing Role of the Institution

Frank J Franzak; Virginia Commonwealth University, United States
Ricardo Arechavala-Vargas; Universidad de Guadalajara, Mexico
Van R Wood; Virginia Commonwealth University, United States

As universities have seen their role rapidly evolve in the last two decades, they have learned to respond differently to their immediate economic context. However, not all universities have been equally successful in developing the capabilities that their new role demands. Many institutional, cultural and structural factors make this change difficult. In order to develop new capabilities and entrepreneurial skills, they must also learn to cope with tech-

nological and market uncertainties, and to be able to convert this knowledge into effective support tools for their spin-off firms. The new firms must also be able develop special abilities to capitalize on this knowledge and on the organizational networks that will provide them with indispensible talent, knowledge and social capital. In this paper we review the literature about this trend in the role of universities, and about those capabilities they have had to develop. We propose a model of those organizational capabilities and of the ways in which they interact with institutional contexts in which universities operate. We illustrate the application of the model with parallel case studies in countries with different institutional contexts, and assess the interdependence of university capabilities with the organizational networks in which they operate.

TE-01 Technology Roadmapping - 2
Tuesday, 7/20/2010, 15:00 - 16:30
Room: Ballroom A
Chair(s) Nathasit Gerdsri; Mahidol University

TE-01.1 [A] The Current State of Technology Roadmapping (TRM) Research and Practice

Ronald S Vatananan ; Mahidol University, Thailand
Nathasit Gerdsri; Mahidol Univeristy, Thailand

Technology roadmapping (TRM) is gaining momentum as a strategic management tool for an organization to integrate technology into its business strategy. This paper reviews over 100 TRM-related publications to provide the community with the current state of roadmapping research and practice. From the literature, the issue of keeping a roadmap alive has been identified as the key challenge in the field. To address this challenge, operationalization and effective implementation of TRM are highlighted as the potential areas for future research.

TE-01.2 [A] Use of Technology Roadmapping in Selecting Projects for Financial Support

Anatoliy Afanasiev; Russian Corporation of Nanotechnologies, Russia
Yuri Khakhanov; Russian Corporation of Nanotechnologies, Russia

Russian State Corporation of Nanotechnologies (RUSNANO) was established by federal law in 2007. Its main activity is selection and co-investing money of the federal budget in nanotechnology projects that have high potential for commercial or social benefit. RUSNANO investments in selected projects are expected to reach 1.5 billion US dollars in 2009. RUSNANO uses foresight and roadmapping techniques to support the investment process involved in the activities leading Russian scientific and business institutes. Foresight allows revealing the most perspective nano-enabled product groups for implementation in Russia in the long-term perspective and estimating required resources for setting up mass production. Roadmaps allow defining priorities for investments, R&D, staff training, infrastructure advance. They help RUSNANO to define strategic goals and choose the most promising technologies. Ten roadmaps are being developed at RUSNANO: light emitting diodes, nuclear energy, aircraft industry, spacecraft industry, medicine and pharmacy, water cleaning and purification, energy saving, halocarbon composite fibres, catalysts for petrochemical industry, and effective cutting instruments. More than 400 experts are actively participating in developing the roadmaps. The roadmaps will be ready in the first half of 2010. The presentation highlights RUSNANO's strategic planning approach by using an example of one of the developed roadmaps.

TE-01.3 [A] A View about RFID Technology in Brazil

Fernando Xavier; Conceptia Consulting, Brazil
Oswaldo Hikage ; University of Sao Paulo, Brazil
Marcelo Schneck de Paula Pessôa; University of Sao Paulo, Brazil
André Leme Fleury; University of Sao Paulo, Brazil

In times of big business competition, technology can be a very important tool for companies to get an advantage over their competitors. One example, a radio-frequency identification (RFID) technology, is getting more investments from companies around world. In Brazil, this technology is getting more investments from companies, universities and the government. This paper will present the real situation about RFID technology in Brazil and some case studies of RFID deployment in Brazilian companies from some sectors, such as the aircraft industry, military and auto based industries. The main objective of this paper is to map RFID technology in Brazil, showing our advances and our difficulties. As a result, research on RFID deployments can be used in other research projects. Another result is that companies can analyze these case studies to get a better idea about their own RFID deployment projects.

TE-02 Decision Making - 3
Tuesday, 7/20/2010, 15:00 - 16:30
Room: Ballroom B
Chair(s) Chi-Yo Huang; National Taiwan Normal University

TE-02.1 [R] Configuring the Next Generation Handset by Using an Emotional Design Based MCDM Framework

Chi-Yo Huang; National Taiwan Normal University, Taiwan
Gwo-Hshiung Tzeng; Kainan University, Taiwan
Yi-Fan Lin; National Taiwan Normal University, Taiwan
Shu Hor; National Taipei College of Nursing, Taiwan

Most research on product design focused on product functionality and utility. However, customers make the purchasing decision by considering not only the product functionalities but also the feeling of using the product. Thus, how to arouse a consumers emotion through product design has become a daily important issue. To resolve this problem, this research aims to develop a systematic emotional design based multiple criteria decision making (MCDM) framework consisting of the analytic network process (ANP) and the grey relational analysis (GRA). The customer requirements for the next generation 4G handset will first be collected and summarized by a literature review. Then, the ANP will be introduced to determine the weights versus each requirement. Finally, the GRA will be introduced for deriving the relationships between requirements (criteria) and the functions (alternatives). The alternatives with the highest grey grades will be selected as the functions of the product. An empirical study based on the next generation 4G handset design will be leveraged for verifying the feasibility of the MCDM framework. The results demonstrate that from the aspect of emotional design, a suitable user interface is the most important factor for developing a successful 4G handset. Furthermore, the touch panel handset is the optimal design to fulfill customers preferences toward the next generation mobile phones.

TE-02.2 [R] Configuring an Embedded System by the Concepts of Emotional Design by Using a Non-additive Fuzzy Integral Based FMCDM Framework

Chi-Yo Huang; National Taiwan Normal University, Taiwan
Hsiang-Chun Lin; National Taiwan Normal University, Taiwan
Gwo-Hshiung Tzeng; Kainan University, Taiwan
Hong-Yuh Lee; National Chao Tung University, Taiwan

An embedded system, a digital electronic system being embedded in a larger device, is the system to be configured to fulfill specific demands of customers from some market segmentations. This nature complicates the design of an embedded system itself. Traditional embedded system marketers usually defined the systems based on their intuition, which could be subjective and misleading. To fulfill different customers demands from various market segmentations, the concept of user-centered design can be leveraged. Thus, this research aims to resolve this issue by introducing a novel fuzzy multiple criteria decision making (FMCDM) based embedded system design method by introducing the concept of emotional design. By using this method, customer needs can be elicited through explorations of their emotions. The fuzzy analytic hierarchical process (FAHP) will be leveraged for deriving the relative weights. Further, considering the characteristic of inter-dependences between criteria, the non-additive fuzzy integral method will be introduced to aggregate the performance scores on each component of the embedded system platform. In this paper, an empirical study on an embedded system design of a handset being designed by one of the worlds largest IT manufacturers will be leveraged for demonstrating the feasibility of

this framework. A satisfying mobile phone can be designed based on the newly proposed FMCDM framework. And this methodology can be used to configure any embedded system to be embedded in other consumer electronics products.

TE-02.3 [A] The Exploration of B2B e-Auction Adaptation Strategy in Taiwan

Ya-Wen Yu; Asia University, Taiwan
Ya-Ti Lin; National Chiao Tung University, Taiwan
Yung-Hsin Chen; Asia University, Taiwan
James K Chen; Asia University, Taiwan

Business-to-business (B2B) electronic-auction (e-auction) has become a popular tool in the business transaction process. However, there are several reasons that cause companies in Taiwan to be reluctant to use this tool. This empirical paper provides a more distinctive direction to enhance the benefit and operational efficiency when seeking the use of e-auction. The obstacles for applying e-auction have been explored based on expert interviews and research data found in some high-tech firms in Taiwan. A decision-making trial and evaluation laboratory (DEMATEL) method has been utilized to evaluate the connection and relationship among the four criteria, which influence decision-making of e-auction adoption. The purpose of utilizing DEMATEL is to realize the relationship between all criteria and to find the optimal solution for firms to adapt to e-auction. The research outcome reveals that the criterion of internal resistance is the primary factor that influences the adoption of e-auction, while operational costs and external resistance tend to be affected by internal resistance. The results of this research can be used to support firms in implementing the e-auction tool more efficiently and consequently gain the most benefit.

TE-02.4 [R] 4G Mobile Phone Consumer Preference Predictions by Using the Rough Set Theory and Flow Graphs

Chi-Yo Huang; National Taiwan Normal University, Taiwan
Ya Lan Yang; National Taiwan Normal University, Taiwan
Gwo-Hshiung Tzeng; Kainan University, Taiwan
Shih-Tsung Cheng; National Taiwan Normal University, Taiwan
Hong-Yuh Lee; National Chao Tung University, Taiwan

At the moment, when mobile phone users are demanding more handset features as well as broader bandwidth, the fourth generation (4G) wireless telecommunication standard is emerging. However, how to define appropriate handset features toward various market segmentations to fulfill customers needs and minimize the manufacturing cost has become one of the most important issues for the 4G handset manufacturers. Thus, a rule-based consumer behavior forecast mechanism will be very helpful for marketers and designers of the handset manufacturers to understand and realize. Moreover, precise prediction rules for consumer behavior being derived by the forecast mechanism can be very useful for marketers and designers to define the features of the next generation handsets. Therefore, this research intends to define a rough set theory (RST) based forecast mechanism for the 4G handset feature definitions. Possible handset features will first be summarized by literature reviews. After that, rules of consumers preferences toward the 4G handsets will be summarized by the RST. To analyze the data and uncover the knowledge inside the rules further, the flow graph will further be introduced for analyzing the information flow distribution. An empirical study on Taiwanese mobile phone users will be leveraged for verifying the feasibility and demonstrate the usability of the proposed forecast mechanism. Meanwhile, the proposed consumer behavior forecast mechanism can be leveraged on defining features of other high technology products/services.

TE-03 Social Network Analysis - 2

Tuesday, 7/20/2010, 15:00 - 16:30
Room: Similan 1
Chair(s) Jiting Yang; Portland State University

TE-03.1 [R] Understanding the Mechanism of Social Network in the Knowledge Transfer Process

Bing Wang; Beijing University of Posts & Telecommunications, United States
Jiting Yang; Portland State University, United States
Hongpei Liu; Beijing University of Posts & Telecommunications, China

Social network as a knowledge transfer mechanism is widely accepted. However, the process of the mechanism is vague. The goal of this study is to clearly expatiate on the functioning mechanism of social network during the process of knowledge transfer. We develop a model of social network which consists of the nodes and ties. The nodes in the knowledge social networks are people; the ties are the knowledge communications. Persons as nodes have a two-way knowledge flow: inflow and outflow of knowledge. There are mental processes involved during the inflow and outflow of the knowledge. Knowledge communication methods are various during the knowledge conversion processes; they can be described by four features: expressive form, intermediary form, real-time/non-real-time, one-way/interactive. The knowledge social network can be found by a formal knowledge transfer organization or informal knowledge transfer relationship. Social networks also provide the motivations for learning. We give a real case of knowledge transfer in the education and career of a student and analyze the functioning mechanism of social network in the knowledge transfer process.

TE-03.2 [R] Accelerating Knowledge Adoption: A Perspective of Social Network Analysis

Hung-Chun Huang; National Chi Nan University, Taiwan
Les Davy; National Chi Nan University, Taiwan
Hsin-Yu Shih; National Chi Nan University, Taiwan

An individual who has the ability to focus and learn quickly is at a distinct competitive advantage over those who do not. As difficult as it may be to accelerate an individuals learning rate, it is even more complicated to accelerate the learning rate of a group. Knowledge management has devoted a great amount of study and research into learning efficiency. In theory, managing knowledge behaviors greatly affects knowledge management. However, in practice knowledge is difficult to manage directly. The structure of a working team represents a miniature social system as well as an internal collaboration network. Differing teamwork structures conduct different knowledge behaviors. Social influence theories suggest that different social proximities evoke distinguishing contagion effects. This study applies a social network perspective to explore the knowledge behaviors of computer software developers. Our findings show that controlling network redundancies can effectively enhance knowledge diffusion efficiency. Furthermore, if a team fails to manage knowledge diffusion, it will potentially offset any competitive advantages that might be gained via upgrading technology. Based on our findings, this study suggests a new approach for implementing knowledge management and R&D strategic planning.

TE-03.3 [R] Knowledge Complementarity and Boundary Spanning for Continuous Innovation

Shari S. C. Shang; National Chengchi University, Taiwan
Chen-Yen Yao; Shih Hsin University, Taiwan

With the increase of customer demands and rapid development of information and communication technologies, enterprises are facing strenuous competition. Global enterprises are currently engaged in continuous innovation to compete and sustain themselves in the dynamic changing market. Both technological and customer knowledge have been identified as crucial for building knowledge complementarity for delivery of innovation. Most studies in the literature focus on testing for the existence of complementarity between inputs and the effect on output, but this study focuses on explaining how technological knowledge complements customer knowledge span boundaries to achieve innovation. Based on the concept of boundary spanning, this study is to design a useful instrument to measure knowledge complementarity for continuous innovation. The result is to provide the operationalizable indexes of the scope and depth of knowledge interaction for knowledge complementarity. Finally, different levels of scope and depth of knowledge interaction for knowledge complementarity will affect innovation.

TE-04 Patent Analysis - 4

Tuesday, 7/20/2010, 15:00 - 16:30

Room: Similan 2
Chair(s) Matti Karvonen; Technology Business Research Center

TE-04.1 [R] Research on Management of Patent Applications about Long Life-Cycle Electric Appliances

Hiroaki Nagatsuka; Tokyo Institute of Technology, Japan
Yoshitoshi Tanaka; Tokyo Institute of Technology, Japan

A lot of patent rights are used for producing assembled products like electric appliances. And electric appliances like digital cameras have a very long product life-cycle. High-ranking Japanese electronics companies file several thousand patent applications each year for protecting their own products. In view of the product life-cycle, the sales of long product life-cycle products tend to be flat after the mature phase, and each company cannot get enough sales and profits. However, some companies continue to file excess patent applications after the mature phase. This kind of patent application will not contribute to corporate profitability. We think this is the reason why each company should pay careful attention to other competitors number of patent applications and do not consider its own financial indicators (for example, sales, income, and R&D expense) which are related to corporate performances. Therefore, in this study we took up some Japanese electronics companies and analyzed correlations among these companies accumulated number of patent applications and correlations between each companys accumulated number of patent applications and its financial indicators. From the result of analyses, we propose IP management for reducing useless patent applications after the mature phase.

TE-04.2 [R] Perception Gap among Japan, Thailand, Vietnam and Philippine in Technology Transfer and Academic-Industrial Collaboration

Takehito Higuchi; Tokyo Institute of Technology, Japan
Yoshitoshi Tanaka; Tokyo Institute of Technology, Japan

This paper focuses on the perception gaps among Japan, Thailand, Vietnam, and Philippines in technology transfer and academic-industrial collaboration from the viewpoint of technology management. The authors found the differences among these countries based on a questionnaire survey. The business activities have been rapidly expanding across country borders with economic globalization. In order to strengthen relationships and fruitfully live together in Asian countries, we need to promote technology transfer and academic-industrial collaboration to grow the local industries. Especially, Thailand Vietnam and Philippines are rapidly developing, and have come to play important roles in the Asian economy. The authors have conducted research on the real needs and obstacles in this field from the viewpoint of technology management. In order to understand the Asia region comprehensively, it is required to understand cultural backgrounds behind such needs and obstacles. To find difference among these countries in technology transfer and academic-industrial collaboration, the authors conducted a questionnaire survey on these countries. Questionnaires were collected from administrations, universities, companies, etc. As a result, factors were extracted regarding technology transfer and academic-industrial collaboration by factor analysis, and analysis of variance was used to compare means among four countries.

TE-04.3 [R] The Heterogeneity of the Technology Strategies in the Patent Pool: The Case of DVD Industry

Yan-Ru Li; Aletheia University, Taiwan
Chen-Tsang Chang; Aletheia University, Taiwan

The characteristics of the patent index are heterogeneous, although the patent pool is essential for high-tech product developments. The objective of this paper is to explore the reliability of existing patent indicators. The empirical study examines the major firms patent indicators for DVD technology. Patent data is thus divided into patent-pool group and non patent-pool group. The results show that forward citations, backward citation, patent family, scientific literature, maintenance, and transfer of assignee are significant indicators; technological lifecycle, number of assignees, and number of claims are not significant indicators. The contribution of this paper is to find the heterogeneity of technology strategies in the same pool.

TE-04.4 [R] Industry and Technology Development in China from 2003 to 2008: A Perspective from Patent Classification Analysis

Jia Zheng; Institute of Scientific and Technical Information, China
Dar-zen Chen; National Taiwan University, Taiwan
Mu-hsuan Huang; National Taiwan University, Taiwan
Zhi-yun Zhao; Institute of Scientific and Technical Information, China
Xu Zhang; Institute of Scientific and Technical Information, China
Xiao-ping Lei; Institute of Scientific and Technical Information, China
Ze-yu Zhang; Institute of Scientific and Technical Information, China
Yun-hua Zhao; Institute of Scientific and Technical Information, China
Run-sheng Liu; Institute of Scientific and Technical Information, China

Patents are the manifest output of industrys R&D effort. This paper explores the development of six industries in China, including chemical (excluding drugs), computers and communications, drugs and medical, electrical and electronics (E&E), mechanical, and others. The results show that the number of U. S. granted utility patents in China as well as their shares in the world had increased over the period 2003 to 2008. Chinas industry distribution was similar to the global industry distribution, except for that E&E industry weighted over one third of the industries and others industry owned the largest number of patents in traditional industries. USPC 361 is the R&D focus in E&E industry, and 88 percent of USPC patents in this category belonged to Foxconn Technology. Co., Ltd. All the industries in China kept rising during this period, which was different from the global situation. The largest growth appeared in the E&E industry, where the growth rate became faster after 2006 due to a sudden increase of patents in USPC 361. However, 90 percent of the newly issued patents in USPC 361 after 2006 were owned by Foxconn Technology. Co., Ltd. So, the overall R&D level of Chinas E&E sector might not be balanced and still needs to be improved. This paper provides an objective statistical reference for future policy directions and academic research.

TE-05 Entrepreneurship/ Intrapreneurship - 1

Tuesday, 7/20/2010, 15:00 - 16:30
Room: Arcadia Hall 1
Chair(s) Hiroaki Harada; Fujitsu Laboratories LTD.

TE-05.1 [A] A Creative Guideline for In-house Inventors Based on Empirical Study

Hiroaki Harada; Fujitsu Laboratories LTD., Japan
Akihiko Obata; Fujitsu Laboratories LTD., Japan

Employee invention in a company is an important theme in MOT, because patents invented by employees can defend technology and products of the company, and can accumulate as intangible assets of the company. This article shows an efficient, creative guideline for in-house inventors, which has been led based on empirical study in an actual company. We researched the invention activity in a software development team of a certain Japanese company and found some bottlenecks at review by in-house IP specialists in the process for filing the application. A comprehensible guideline, which was derived from document analysis and observation, has helped the inventors to explain to the reviewers efficiently. As a result, the team has obtained some effects like a decrease of wasted inventing labor and an increase of the application rate.

TE-05.2 [R] Corporate Entrepreneurship Environment and Organizational Performance in Technology Manufacturing Sector

Guillermo Cangahuala; National Chung Hsing University, Taiwan
Ming-Huei Chen; National Chung Hsing University, Taiwan

This paper attempts to investigate the relationship between corporate entrepreneurship environment and organizational performance from a middle managers perspective in Taiwans technology manufacturing sector. Researchers assessed the key internal organizational factors that influence middle managers in the corporate entrepreneurship environment,

such as management support, works discretion, rewards, time availability, and organizational boundaries. On the other hand, corporate entrepreneurship is named as encompassing three related components: product innovation, proactiveness, and risk taking. In this paper, the organizational performance was measured as innovation performance, market performance and financial performance. Utilizing information provided by middle managers from 500 validated questionnaires and taking in account some suggestions from entrepreneurship researches, five internal organizational factors were identified and investigated in this study, and three related components for corporate entrepreneurship were identified. While analyzing these five factors, we examined their relationships amongst the three related components for corporate entrepreneurship and organizational performance. The results demonstrated that corporate entrepreneurs with proactiveness are positively associated with innovation performance, market performance and financial performance. In general, four out of the five internal organizational factors (management support, works discretion, rewards, time availability, and organizational boundaries) in this research clearly highlight that internal organizational factors positively influence organizational performance. Among these four, rewards and organizational boundaries are the most significant. Only time availability is negatively associated with organizational performance, which implies that if firms give more work, time constraints, standard operating procedures and documental working process, then middle managers will have limited time to improve or design new plans for Taiwans firms.

TE-05.3 [R] Measuring Regional Innovation and Entrepreneurship: The Case of Taiwan Science Parks

Yuan-Chieh Chang; National Tsing Hua University, Taiwan
Ming-Huei Chen; National Chung Hsing University, Taiwan
Yuan-Po Lin; National Tsing Hua University, Taiwan
Yu-Shiang Gao; National Chung Hsing University, Taiwan

In the face of internationalization and rapid industrial transformation environment, how to sustain a regional innovation and entrepreneurship has become an important issue of science park strategic planning. Having reviewed four theoretical building blocks: (1) the creative class theory, (2) intellectual capital, (3) regional innovation system, and (4) industrial clusters, the study developed a survey instruments with four dimensions and 15 indicators to measure the regional innovation and entrepreneurship. The questionnaires were distributed to 100 experts such as managers of Taiwan North, Central, and South Science Park Administrations, and related research areas professors, managers of Innovation Incubator Center and corporate R&D managers. There are total 46 valid returned questionnaires, an overall respondent rate 46%. By AHP (Analytic Hierarchy Method) analysis, this study has shown that “Industrial Cluster” followed by “Regional Entrepreneurship”, “Regional Culture”, and finally is “Regional Financing” are crucial. (2) the first three indicators of global priority are “Upstream, midstream, and downstream industries integrity”, “Assistance of Regional Innovation Incubator”, and “Abundant regional talents pool”; (3) in each dimensions, “Abundant Regional venture capital” is the most important indicator in regional financing dimension, “Upstream, midstream, and downstream industries integrity” is the most important indicator in industry cluster dimension, “Assistance of Regional Innovation Incubator” is the most important indicator in regional entrepreneurship dimension, “Encourage self-entrepreneurship” is the most important indicator in regional culture dimension. The results are helpful to policy guides Taiwan Science Park Administrations to sustain healthy regional innovation and entrepreneurship system in the island and where else.

TE-05.4 [R] The Effect of Corporate Entrepreneurship and Opportunity Recognition Model on Entrepreneurial Performance: A Case of Taiwanese Service Start-ups

Yu-Ning Hu; National United University, Taiwan
Chih-Lung Chou; Hwa-Hsia Institute of Technology, Taiwan
Li-Hua Chen; China Youth Career Development Association, Taiwan

For the past fifty years, small businesses founded by entrepreneurs have been not only the base of the economy of Taiwan, but also the main vigor of the economy. Among the start-up business activities, seeking opportunities and shaping corporate entrepreneurship are important factors affecting the success of the start-up. This study proposes that entrepreneurs should design proper organizational culture and institutional rules that increase the firm’s proactiveness, and adopt a more market-oriented model of prototyping to appraise and seize new opportunities so that they can enhance entrepreneurial satisfaction, the major dimension of the entrepreneurial performance.

TE-06 Technology Management in Service Industry - 1

Tuesday, 7/20/2010, 15:00 - 16:30
Room: Arcadia Hall 2
Chair(s) Mel Horwitch; Polytechnic University

TE-06.1 [R] Technology Interfaces in Product-Service Integration: Concept and Typology

Youngjung Geum; Seoul National University, Korea, South
Daekook Kang; Seoul National University, Korea, South
Hakyeon Lee; Seoul National University, Korea, South
Yongtae Park; Seoul National University, Korea, South

Today, the body of literature has been almost unanimous in integrating services into their core products. What is at the core in integrating products and services is the technology, providing the organic interface between products and services. Despite the importance of technology, however, considering the role of technology in product-service integration still remains a void in the literature. In response, this paper suggests the concept of technology interface in product-service integration and investigates the role of technology in moderating the product-service integration. Firstly, the concept of technology interface in product-service integration is clarified. Following on the definition, six types of technology interface are proposed according to the configuration of interaction between products and services. Finally, corresponding characteristics, case examples for each type of technology interface are suggested regarding how the interface can contribute to moderate the structural and functional integration of products and services and to provide the increased customer value.

TE-06.2 [R] Three-Dimensional Service Value Creation Model Based on Multidisciplinary Framework

Kotaro Nakamura; eCraft inc. (JAIST), Japan
Takahiro Imahori; Nikkan Kogyo News Paper Ltd., Japan
Yasuo Ikawa; Japan Advanced Institute of Science and Technology, Japan

This paper is focused on the process of value creation in the service business and on the shift of service value created in actual service businesses. The analysis is used to demonstrate proposed models for explaining this shift. Service value is successfully created when customers enjoy the benefits of services proposed through a system of service businesses. The model visualizes the shift of service value, focusing on the three axes of width (of the place for service providing/usage in the service interaction points), level (of user satisfaction), and autonomy (the degree of customer involvement in service co-creation) of service value, which are added one after the other as three ordinal scales integrated into a three dimensional service value model. Knowledge creation theory, social psychology, and recent advances of service theory are considered aiming to apply the model to understanding the value creation in actual service businesses and to using the new insights for promoting value creation in service organizations characterized by active customer interaction. The validity of the proposed model is tested on case studies involving accommodation and network-based services. In two cases (the flower tourism navigation service Hana-Navi and the robotized music entertainment service Miuro) the model’s validity is confirmed through interviews with top executives and managers, major service planners of the respective services. The service value visualization through the three-axis model and the method for investigating the related service embodiment provide common service concepts and show a methodology for systematic service planning.

TE-06.3 [A] The Deployment of the Auto-ID System in a Conference

Kullaprapa Navanugraha; NECTC, Thailand
Pornanong Pongpaibool; NECTC, Thailand

Chalee Vorakulpipat; NECTC, Thailand
Nuttapong Sanglerdsinlapachai; NECTC, Thailand
Nutvadee Wongtosrad; NECTC, Thailand
Siwaruk Siwamogsatham; NECTC, Thailand

This paper investigates the deployment of the auto-ID system, 2D-barcode and Radio Frequency Identification (RFID) system in a conference to manage the conference sessions, to observe the participant behavior, and to record their interests. Within the conference context (e.g. meeting room, hall, or banquet), the study suggests the use of RFID in ultra-high frequency (UHF) band rather than any other bands because of its capability of detection of RFID tags in a range of appropriate distances. The paper presents an example of the design of the 2D-barcode and RFID system and the application in terms of managerial issues and the management of recorded participant data, deployed in the NAC 2007 and ISAP 2009 held in Thailand. The study also highlights the importance of rich information about participant behavior emerging from the recorded data that would be benefit by further analysis such as the arrangement of conference sessions, classification of participants by interests, and design of conference venues. The effectiveness of the deployed RFID systems was also evaluated via questionnaires by the participants. The results suggest a good level of satisfaction, especially the paper voting feature. Additional useful recommendations were also observed from the survey.

TE-07 New Product Development - 1
Tuesday, 7/20/2010, 15:00 - 16:30
Room: Lagoon Hall 1
Chair(s) Robert Harmon; Portland State University

TE-07.1 [R] Integrated Development of Modular Product Platforms

Günther Schuh; RWTH Aachen University, Germany
Jens Arnoscht; RWTH Aachen University, Germany
Stefan Rudolf; RWTH Aachen University, Germany

The systematic fostering of economies of scale is essential for companies to obtain their competitiveness in the future. A proven solution for the resulting dilemma between scale and scope are modular product platforms, which can be designed in two different ways: Modules can be developed either for a dedicated product line and then be added to the platform, or they can be developed directly for the entire modular product platform the products are derived from. A recent survey conducted by our chair states that developing modules for the entire platform covers a higher potential to create commonalities. However, this approach requires more capabilities to cope with complexity, since individual development projects are highly interconnected and no longer subject to the requirements of only a single product line. Current research approaches mainly focus on the design of modular platforms, whereas challenges concerning the design of the related organizational structure are hardly considered. This paper aims at presenting an organizational framework for the integrated design of modular product platforms. A process model has been developed containing the following steps: planning of platform products, design of modular product platform structures using degrees of freedom, development of modules and configuration and adaptation of products.

TE-07.2 [R] Analysing the Technology Relevance of Nanotechnology in Product Planning

Daniel Heubach; Fraunhofer IAO, Germany
Joachim Warschat; Fraunhofer IAO, Germany

Emerging technologies like nanotechnology are considered a driving force for innovation. With impacts to be anticipated for nearly every industry, nanotechnology and applications can be considered cross-section or enabling technologies. In this, however, development in the fields of nanotechnologies is still mostly technology and opportunity-driven. Furthermore, the nanotechnology potential in terms of technological function and utility, with new effects and properties of nano-scaled materials and -structures in particular, are yet to be discovered in enterprises as well as with developers and designers communities. Between the technological bank of nanotechnologies and application banks, a significant gap is to be recognized. Therefore, new management approaches are necessary to cope with uncertainty of knowledge in nanotechnology during the early phases of innovation processes and product design. This paper presents an approach for analyzing and assessing technology relevance nanotechnology in the product planning context. The assessment is based on a product function-related feasibility analysis covering several factors for potential success. The objective is to match the potential effects and properties of nano-materials and -structures with product functions to highlight feasible application fields. Thus, enterprises get a specific assessment of where and how they can apply nanotechnology. A use case shows the application of this relevance analysis by a German enterprise from filling and packing machines industry.

TE-07.3 [R] Portfolio Management of New Products and the Impact of Manager's Heuristic During the Development Process

Leonardo R Tavares; Federal University of Minas Gerais, Brazil
Leonardo P Santiago; Federal University of Minas Gerais, Brazil
Pirooz Vakili; Boston University, United States

The R&D portfolio selection is one of the drivers of the medium and long term success of most companies. Several papers have already discussed the factors that influence the project selection and budget allocation, and also how the projects should be managed in order to achieve better results. However, considering the complexity of the problem and the lack of a prevalent approach to it, many managers still rely on heuristics to support their decision process. The present paper aims to discuss the impact of heuristics used by decision-makers during the process of forming an R&D portfolio. We consider simple ad hoc rules such as higher probability of development success, higher commercial return, and lower risk, which are commonly used by managers to select and allocate resources on projects during the development process. We take into account the fact that the development and commercialization phases are distinct and, therefore, should be managed appropriately as far as budget implications and information availability are concerned. We illustrate our approach with numerical examples for each of the three heuristics and compare it with the value of a companys optimal portfolio. We conclude by discussing managerial implications of opting for these heuristics criteria.

TE-08 Cultural Issues - 1
Tuesday, 7/20/2010, 15:00 - 16:30
Room: Lagoon Hall 2
Chair(s) Peerasit Patanakul; Stevens Institute of Technology

TE-08.1 [R] Puppet Play? A Study of Control Mechanisms and Cultural Values in High-Tech Firms

Ricarda B Bouncken; University of Bayreuth, Germany
Aim-Orn Imcharoen; University of Greifswald, Germany
Viviane A Winkler; University of Greifswald, Germany

The success of new products for international markets improves when developed in international teams. Such teams combine knowledge of different markets and culturally influenced preferences of consumers. Yet, international teams, including members of diverse culturally embedded values and behaviors, face more difficulties than mono-cultural teams. This paper explores the effects of project control on innovativeness and project performance in international teams. Our study is based on 75 participants in the semiconductor industry in five countries. The results of our moderated regression analyses indicate that control has dissimilar effects on project innovativeness and performance depending on the cultural values of project members. From our findings we derive culture-specific implications for innovation project management.

TE-08.2 [R] Toward Finding Culture Assessment Tools for SE Companies

Petri Linna; Tampere University of Technology, Finland
Hannu Jaakkola; Tampere University of Technology, Finland

Nowadays, globalization is a normal action for almost every company in the drive to sell more and more products or services to sustain business growth. Companies need to create

an inclusive work environment through intercultural competence and ensure a sufficiently diverse workforce. Employees have to work in national and international teams, consisting of different kinds of people. Some of the team members might come from very diverse cultural backgrounds. The project manager faces challenges in leading and managing these multicultural teams effectively. Companies should also know the cultural backgrounds of their customers and partners. One cannot afford to stumble many times due to cultural differences that might cause harmful misunderstandings and thus the loss of business. This paper first introduces information about culture and its definitions, dimensions, terminology, research branches and recognized problems. Many points of view are listed and analyzed where one can find reasons to measure the cultural factors in a company. Examination is made of what kinds of tools are available for assessing cultural factors. Because so many cultural assessment tools were found, instead of analyzing dozens of tools, we compiled a table including the characteristics of the tools, which should be considered before selecting the appropriate tool for each company. This examination is being undertaken in two ongoing projects: UbiKnowS and STEP, based on a literature review and case studies on how these assessment tools can be used in actual SE companies.

TE-08.3 [R] The Relationship between Gender Difference and Employee Workplace Friendship: Taiwan and Mainland China

Chun-Ling Lu; Yu Da University, Taiwan
Chun-Te Lin; Yu Da University, Taiwan

Western scholars discovered that the gender difference of an employee has some varies on workplace and affects his or her salary, promotion and work conditions etc., but these are all external factors. In 2009, a study showed the relationship of internal factors that the personal perceptions of gender discrimination in the workplace. But there still are no studies on internal factors on personal perceptions of gender differences and whether that may affect employee workplace friendship. The samples of this study are the full-time employees in Taiwan and Mainland China companies. This study identifies the relationship between gender difference and employee workplace friendship, and further discusses if there are any differences between those in Taiwan and Mainland China for clarifying what impact the geographic difference has on the relationship between these two regions.

TF-03 TUTORIAL: Implementing Project Management Methodologies in Organizations: Global Success Stories

Tuesday, 7/20/2010, 17:00 - 18:30
Room: Similan 1
Speaker(s) John R Patton; Cadence Management Corporation

What is the difference between a standard for project management and a methodology for using a standard? What are the essential elements of a methodology? How does project practice maturity influence the selection of a governance model or project management office? What is the best way to implement a project management methodology? What are the key tasks of implementation? What is the annual cycle which results in continuous improvement? How does one show executives the value of using best practices? These questions are answered by the speaker through presentation, case histories, and group discussions during this tutorial. The tutorial is targeted toward people who would like to increase productivity in their institution or obtain a sustainable competitive advantage in their company.

TF-04 Technology Assessment and Evaluation - 1

Tuesday, 7/20/2010, 17:00 - 18:30
Room: Similan 2
Chair(s) Thanaphol Virasa; College of Management, Mahidol University

TF-04.1 [R] Research on Evaluation Technique of Patented Invention Using Both Technical Value and Economic Value

Tsutomu Kimura; Tokyo Institute of Technology, Japan
Yoshitoshi Tanaka; Tokyo Institute of Technology, Japan

The number of patent applications is around 400,000 a year in Japan, and its ratio by the Japanese applicant achieves about 84 percent out of the total number of patent applications. This ratio is extremely high compared with the ratio filed by each nationality in Europe and in the US. The number of applications or/and the number of registrations, etc. have been often used to evaluate the companys strength using patents, compared with the competitors strength using patents. However, said number does not describe the value of patents. In this study, we propose an evaluation technique of patented inventions using both technical value such as the number of patent citation, ratio of patented inventions to patent applications, and economical value such as the sales of the commercial products, etc., which can be called the micro approach. This method makes it possible to give substantial evaluation of patented inventions, and gives an evaluation tool for intellectual property management which supports the decision making whether the invention shall be filed or not, reducing the useless patents, which will lead to maintaining the companys competitiveness using limited resources effectively. In addition, the proposed method for evaluating a patents value will contribute to strengthen technology management.

TF-04.2 [R] Research on a Technological Evaluation Method Applying Patented Invention for Strategic Technology

Yu-Cheng Chuang; Tokyo Institute of Technology, Japan
Yoshitoshi Tanaka; Tokyo Institute of Technology, Japan

Patent value is defined and described from the following three aspects: market value, legal value and technological value. There have been several studies done regarding market value and legal value of patents, but no specific research on the technological value of patents, which can be evaluated from patented invention. The technological value is essential to give strong impacts on its market with long life cycle of the product. In case there is a high inventive step, it will not be easy for competitors to catch up to produce the similar products. However, in case with small inventive step, it will not be a leading product. This research focuses on a specific product field, stent, with two major manufacturers, Cordis and Terumo, and proposes a technological evaluation method with technological leveling, applying multivariate analysis to extract the specific technological features of the said manufacturers competing with each other to establish their own superior field as a result of their own R&D activities. The point for technology management is how to produce a breakthrough product having a high technological value. Based on the proposed evaluation method, the technology can be properly evaluated to give essential information for decision making of strategic technology management.

TF-04.3 [R] An Analysis for Chinese Patent Competitiveness through the USPTO Database in 2008

Xiao-ping Lei; Institute of Scientific and Technical Information , China
Dar-zen Chen; National Taiwan University, Taiwan
Mu-hsuan Huang; National Taiwan University, Taiwan
Jia Zheng; Institute of Scientific and Technical Information , China
Zhi-yun Zhao; Institute of Scientific and Technical Information , China
Xu Zhang; Institute of Scientific and Technical Information, China
Ze-yu Zhang; Institute of Scientific and Technical Information , China
Yun-hua Zhao; Institute of Scientific and Technical Information , China
Run-sheng Liu; Institute of Scientific and Technical Information , China

This article evaluates the competitiveness of China, during the period between 2004 and 2008, through patent performances of six technology fields, including chemistry, computer and communication, biotechnology and pharmaceuticals, electrical and electronic machinery, mechanical, and other. For the purpose of observing the patent trends and the major companies in above six fields, various indicators are employed to evaluate patent quality, including the patent count, the current impact index, the patent share, the patent activity, and also two novel indicators, the essential patent index and the essential technological strength. According to the share of patents, major enterprises of China in 2008 have been chosen for investigation. From these enterprises, essential assignees in each technology field are identified and analyzed to evaluate the performances. The findings reveal that the amount of patents from China issued by the United States has been increasing year by year. In addition, the avant-garde capacities of electrical and electronic machinery and

computer and communication are higher than that of other fields. Finally, it can be concluded that China has been upgrading its patent competitiveness step by step in recent years. Furthermore, Chinese local companies have been becoming the primary innovational strength of China.

TF-04.4 [A] The Relationship between Buying Situation and Customer Complaint Behaviors of Information Technology Industry in Taiwan

Pei-Ming Lee; DE LIN Institute of Technology, Taiwan
Hui-Chen Chiu; Chinese Culture University, Taiwan
Hsien-Tung Tsai; DE LIN Institute of Technology, Taiwan
Jennjia Huang; Tamkang University, Taiwan

The information technology industry was one of the key components for global economic growth. Especially, the enterprises of the information technology industry attended international exhibitions, which carried a very large number of business transactions in Taiwan. Past research has shown that enterprises could make use of the skill and technology of international exhibitions to promote products to their customers, which was a very important thing for international marketing management. But no empirical studies explained the relationship between the buying situation and customer complaint behaviors in international exhibitions. This paper aims to investigate the relationship between the buying situation and customer complaint behaviors. Two hundred and twenty-three match data were analyzed to test the research hypotheses. The finding showed the positive relationship between the buying situation and customer complaint behaviors. Finally, implications of these findings and suggestions for future research will be discussed.

TF-05 Entrepreneurship/ Intrapreneurship - 2
Tuesday, 7/20/2010, 17:00 - 18:30
Room: Arcadia Hall 1
Chair(s) Anita Leffel; University of Texas at San Antonio

TF-05.1 [R] Role of the Small Business Development Center Assistance Network in Establishing and Sustaining High Value-Added Industries in Latin America

Minerva R. Garcia Delgado; University of Texas at San Antonio , United States
William T Flannery; University of Texas at San Antonio, United States
Cory Hallam; University of Texas at San Antonio, United States

America's Small Business Development Center (SBDC) Network is the primary small business assistance network in the United States and its territories. Hosted by leading universities, colleges, and state economic development agencies, and funded partially through a partnership with the U.S. Small Business Administration, more than 1,000 SBDCs provide no-cost counseling and low-cost training to help new entrepreneurs realize their dream of business ownership, and to assist existing businesses to remain competitive in the complex marketplace of an ever-changing global economy. The International Trade Center, hosted at the University of Texas at San Antonio, has initiated several programs in Mexico to replicate the SBDC network concept. Efforts have focused on establishing an association of SBDCs across Mexico, developing accreditation standards to ensure quality small business assistance services, and building the network capacity. The goal is to encourage the development of high value-added industries and assist the development of sustainable technology-based economies. This paper discusses the process by which these initiatives are being established, the progress to date, and the lessons learned in establishing these networks in different cultural and national environments.

TF-05.2 [R] Technological Entrepreneurial Intent in a Geographically Isolated Environment: The Case of the Canary Islands

Jose María Muñoz Franco; University of Texas at San Antonio, United States
Cory Hallam; University of Texas at San Antonio , United States
Anita Leffel; University of Texas at San Antonio, United States
Aday Magec Mederos Sosa; University of Texas at San Antonio, United States

The level of technology entrepreneurship in a geographic region is an indicator and input to the creation of wealth and prosperity, via the creation of new jobs, business opportunities, and technological value added. Underlying cultural factors, personality traits, and economic incentives and barriers can all have an impact on entrepreneurial intent and thus influence the growth of the technology-based economy and prosperity of a region. A follow-on study to prior work in this area in the U.S. is focused on the Canary Islands, a Spanish archipelago off the Northwest coast of mainland Africa comprised of seven islands and approximately two million inhabitants. Due to their geographical characteristics, they are considered a geographically isolated region by definition given by the European Commission. This isolation causes territorial, social and cultural exclusion phenomena. Despite having two large universities with a high population of graduates in business, science and technology disciplines, the rate of technology-based business start-ups continues to remain very low. This study provides an initial assessment of the technological entrepreneurial intent of Canarian university students using the accelerating collegiate entrepreneurship (ACE) model as a baseline tool to understand the potential relationship between cultural factors and this low intent.

TF-05.3 [R] The Development of Center of Entrepreneurship and Business Incubator in Pangalengan, West Java - Indonesia

Leo Aldianto; Bandung Institute of Technology (ITB), Indonesia
Bambang Rudito; Bandung Institute of Technology (ITB), Indonesia
Isti R Mirzanti; Bandung Institute of Technology (ITB), Indonesia
Bob Situmorang; Bandung Institute of Technology (ITB), Indonesia
Dwi Larso; Bandung Institute of Technology (ITB), Indonesia

Indonesia has recognized the importance of entrepreneurship and innovation as an engine for growth. Many of the still small numbers of entrepreneurs have been identified as necessity entrepreneurs, who undertake little or no innovation. Global Entrepreneurship Monitor (GEM) has studied that necessity entrepreneurship contributes marginally to economic development, while opportunity entrepreneurship contributes significantly. Consequently, efforts are needed to create more opportunity entrepreneurship in Indonesia. Supported by government and private companies initiatives, entrepreneurship education programs in Indonesia are growing. This research tries to build an effective entrepreneurship education program in Pangalengan district in West Java province in Indonesia. The creation started with a social mapping, which reveals the characteristics and value orientation of Pangalengan people. The results of that social mapping are utilized to design a center of entrepreneurship, which will cover the whole activities of new venture creation such as business ideas generation, training, funding, and incubation of the business. This paper describes the development of the center, which is currently in operation and has started training the first batch of potential entrepreneurs.

TF-06 Global Issues - 1
Tuesday, 7/20/2010, 17:00 - 18:30
Room: Arcadia Hall 2
Chair(s) Fred Y Phillips; Alliant International University

TF-06.1 [R] Constructing National Innovative Capacity in Globalization: The Network Autocorrelation Perspective

Hung-Chun Huang; National Chi Nan University, Taiwan
Hsin-Yu Shih; National Chi Nan University, Taiwan
Ya-Chi Wu; National Chi Nan University, Taiwan

Globalization has highlighted change in national technology capability. Exogenous factors drive a country towards technological progress, and drive economic growth via international technology diffusion. Previous studies have stressed that innovative capacity is determined by regional or local social systems. This paper reconsiders these studies and develops a new perspective of evaluating national innovative capacity. This method employs a network autocorrelation model which simultaneously considers both endogenous determiners and exogenous influence on national innovative capacity. Data from 42 countries from 1997 to 2002 are utilized to empirically examine their network relationship and innovation performance. The analytical results demonstrate the effect of domestic determiners within

a global context and show that their differential context attribute influence on national innovative performance is influenced more by network positioning than by network partnership. They furthermore exhibit important differences between the alternate channels of international technology diffusion and their differential effects on innovative performance. This finding provides a new perspective for science and technology policy makers.

TF-06.2 [R] Towards 'Fair Globalization': Critical Success Factors for Partnering Project of Development and Enterprise Project

François A Ravalison; University of Antananarivo, Madagascar
Elisé Raveloson; University of Antananarivo, Madagascar
Etienne Rakotomaria; University of Antananarivo, Madagascar

The purpose of this paper is to identify and evaluate critical success factors (CSFs) that impact positively on partnering project of development (PoD) and enterprise project (EP). The data are collected from an International Labor Offices (ILO) pilot project implemented in Madagascar which had utilized the Training for Rural Economic Empowerment (TREE) methodology. Then, other data were gathered from a questionnaire survey of 34 enterprises, five months after completion of the project. And quality assurance coupled with correlation was conducted to analyze the data. Results reveal that nine CFSs shape and impact the partnership of PoD and EP. Then, a Golden Triangle was identified to model partnering success. This paper provides a valuable guideline for policy makers to align their economic growth approach with pro-poor growth. This paper shows the importance of technology management in contributing to the implementation of a fair globalization. It will help many PoDs to integrate their beneficiaries into such fair globalization.

TF-06.3 [R] Globalization of Innovation Networks: A Model of the Process

Ricardo Arechavala-Vargas; Universidad de Guadalajara, Mexico
J. Adam Holbrook; Simon Fraser University, Canada

Research on innovation networks has increasingly considered their internationalization as a natural later stage in their evolution, necessitated by augmented competition and acceleration of technology cycles. A complex dynamic ensues in such later stages as firms and other actors in the innovation network begin to pursue their own interest in the innovation space, as it grows from local to global contexts. Grounded in complex system theory, in this paper we present a theoretical model of the interaction between centrifugal and centripetal forces that shape the decision making space in which entrepreneurs and higher management act as interdependent actors in a complex system. We base this model on an analysis of the way in which locally available resources, such as talent and knowledge interact with evolving business models, as technology-based firms face economic and technological uncertainties, and we set forth testable propositions derived from the model with the aim of identifying likely evolutionary paths in other innovation networks. Interview data from firms in the Vancouver fuel cell cluster is used to illustrate different components and processes in the model. Policy implications for innovation at the regional level are discussed.

TF-08 Cultural Issues - 2
Tuesday, 7/20/2010, 17:00 - 18:30
Room: Lagoon Hall 2
Chair(s) Ricarda B Bouncken; University Bayreuth

TF-08.1 [R] Communication Behaviour in International Engineering Projects: An Empirical and Comparative Study between South Africa and China

Dongdong Jiang; University of Pretoria, South Africa
Leon Pretorius; University of Pretoria, South Africa

In the past, researchers have pointed out that project management is not universal but culturally sensitive. Researchers and practitioners have realized that developing scheduling techniques is not sufficient to achieve successful engineering projects. Communication behavior is also a critical cultural issue for achieving project success. In this article, the communication behavior of Chinese project managers is assessed in a cultural context and the communication behavior effect on five project activities (project communication, negotiation, conflict solving, contract process and team building) is studied. This is an empirical study using surveys to explore the cultural differences between Chinese and South African engineering project managers on communication behavior and the effects on the five project management activities in construction industry. Although the questionnaire is designed based on Chinese culture, South African project managers have also been asked to participate in order to illustrate the differences where applicable. There are significant differences between the Chinese and South African project managers in their communication behavior on three project activities. However, during the contract process, there seems to be no significant difference between their communication behaviors.

TF-08.2 [R] Improved Productivity through Implementation of an Improved Productivity through Implementation of a Manufacturing Technique that Emphasizes Cultural and Value Systems of an Organization

Pule A Kholopane; University of Johannesburg, South Africa
Katlego Mabote; The De Beers Group, South Africa

Most manufacturing approaches and techniques currently being used by most companies are designed to boost productivity, sustainability, and growth. Each of these approaches uses different tools to achieve these purposes. However, none of these techniques considers the effect of cultural and value systems of an organization and how these can contribute to productivity. This paper reports on the results of a longitudinal field study that examines how cultural and value systems of an organization affect productivity of an organization. It unpacks various manufacturing approaches and techniques and ties them to cultural and value systems. The paper offers qualitative insight into the nature of these systems, their relevance within a working environment and how they influence ordinary workers at the plant level. The extent to which these systems can be applied has a bearing on productivity as proven by a case study carried out in one multinational company. It is demonstrated in this study that if these systems are well defined and well practiced, they can boost staff morale, motivation and performance. The paper concludes that a manufacturing technique that emphasizes the cultural and value systems of an organization can lead to productivity improvement.

TF-08.3 [R] Does Team Culture Matter? An Empirical Study in Multiple-Project Management Settings

Peerasit Patanakul; Stevens Institute of Technology, United States
Zvi H Aronson; Stevens Institute of Technology, United States

In the literature, team culture has been suggested as one of the factors contributing to the success of a project. In essence, a project manager should create a culture emphasizing teamwork, communication, and knowledge sharing. Such a culture will lead to team effectiveness, which will eventually contribute to the project success. A question arises whether or not this notion is relevant in practice, especially in a multiple-project management setting where one project manager leads multiple, simultaneous projects. To answer this question, the main objective of this study is to empirically explore the relevance of team culture in multiple project management. The result of this study reveals a surprising finding that team culture does not contribute to the success of a project in multiple-project management settings. Other factors provide more significant contributions to project success.

WA-01 PLENARY - 4

DATE: WEDNESDAY, 7/21/2010
TIME: 08:00 - 9:30
ROOM: BALLROOM A
CHAIR: DR. YOUNGRAK CHOI, KOREA UNIVERSITY, KOREA

WA-01.1 LEONARDO: The Artist Doing Science The Scientist Doing Art

Bulent Atalay; University of Mary Washington, United States

Leonardo is known as a supreme artist, the creator of the two most famous works in the history of art. What is less well known is that he was only a part-time artist. His relentless curiosity to understand the world drove him to study nature, make careful observations, seek mathematical proofs, and record all his findings. Some of his discoveries prefigured achievements we associate with Galileo, Newton and Darwin. He even prefigured entire sciences not to be formally invented for centuries. With unrivaled drafting skills, he created mechanical drawings for future technology, and anatomical studies that would never be equaled. But then, when he created his miraculous paintings, he imbued them with his scientific passions: his intuitive knowledge of optics, geology and mathematics. Leonardo was in the business of inventing the future. But since he never got around to publishing his discoveries, he would not materially influence the future. Therein lies the tragedy of Leonardo. Physicist-artist-author Bulent Atalay invokes Leonardos model in order to attain the larger goal of achieving a synthesis of disparate fields by presenting science through art, and art through science.

WB-01 New Product Development - 2
Wednesday, 7/21/2010, 10:00 - 11:30
Room: Ballroom A
Chair(s) David Wilemon; Syracuse University

WB-01.1 [R] Technology Newness as a Mediator of NPD Strategy, Organizational Integration, and NPD Performance

Murray R Millson; California State University, United States
David Wilemon; Syracuse University, United States

This paper explores the NPD strategy/NPD performance and NPD strategy/integration interfaces as they are mediated by the technological newness of products. Our study investigates these research questions: (1) Does NPD strategy development proficiency relate to new product success?; (2) Is NPD strategy development proficiency related to the degree of organizational integration during such projects?; (3) Is NPD strategy development proficiency associated with the resulting degree of R&D/manufacturing task proficiency?; (4) Is NPD strategy development proficiency related to marketing task proficiency?; and (5) Do the relationships noted above vary with the degree of technological newness? Our overall sample consists of 131 new product projects in the medical devices, electrical equipment, and heavy construction equipment industries. Our study was based on a random sample of the firms operating in these three industries. Our study data suggest that for technologically new products, strategy development proficiency is significantly related to the proficiency with which R&D/Mfg and marketing activities are performed. Additionally, we found a strong association between NPD strategy development proficiency and four measures of new product market success. We noted that the degree of technology newness varied between the most and least successful products in our sample. Our study results indicate that there is also a strong relationship between NPD strategy development proficiency and the degree of organizational integration. Finally, our data suggests that the degree of technology newness has mediation characteristics that need to be recognized. We develop implications for scholars and managers.

WB-01.2 [R] Multitasking in the Product Development Process: How Opposing Cognitive Requirements Affect the Designing Process

Sarah Lukas; Institute of Psychology, RWTH Aachen, Germany
Günther Schuh; WZL, RWTH Aachen, Germany
Dennis Bender; WZL, RWTH Aachen, Germany
Frank T Piller; Technology & Innovation Management, RWTH Aachen, Germany
Philipp Wagner; Technology & Innovation Management, RWTH Aachen, Germany
Iring Koch; Institute of Psychology, RWTH Aachen, Germany

Engineers in development projects have to deal with a variety of cognitive challenges, especially in the process of problem solving. These requirements are often opposing. For example, the resulting product should become more cost-efficient and at the same time more powerful. The process of coping with various and often opposing requirements in product development resembles cognitively the simultaneous processing of multiple subtasks. In the research of cognitive psychology, it was found that the simultaneous processing of different tasks causes performance impairment because the competing task demands interfere with each other. The aim of our study was to transfer cognitive psychological results of multitasking to the management of product development. On this basis a study was designed to empirically explore cognitive processes and multitasking effects during the product development process. For this purpose, engineering students accomplished different construction tasks with two different goals (i.e., as economic as possible vs. as functional as possible). In one condition, they had to switch randomly between these two goals, in the other condition, they first processed the tasks according to the first goal and then according to the second goal. We discuss our results in terms of cognitive requirements and draw conclusions for an effective and efficient innovation management.

WB-01.3 [A] A Process of Identifying & Solving Barriers to Product Development Team Success

Murray R Millson; California State University, United States
David Wilemon; Syracuse University, United States

Developing major new products is a major corporate undertaking. As a general rule, the more complex the product the more likely difficult issues will develop which can retard development success. This presentation is a case study of one development team in the medical device industry and how the numerous problems it faced were identified and resolved. We employed a survey of the key team members containing both closed and open-ended questions. The results were tabulated and then presented to the team for their additional comments/suggestions. The team and the authors then devised a plan for resolving the major issues identified. Upon completion of the project, follow-up interviews were conducted with the team to assess how the team process assessment performed and how it contributed to the successful development of the new product. Suggestions were also made regarding how to improve the process. The authors conclude with suggestions about how the team improvement process can be used with other development teams.

WB-02 Enterprise Management - 1
Wednesday, 7/21/2010, 10:00 - 11:30
Room: Ballroom B
Chair(s) Toryos Pandejpong; Mahidol University

WB-02.1 [R] The Study of Family Business Succession in Large Enterprises

Umaporn Rosarpitak; King Monkutt University of Technology, Thailand
Toryos Pandejpong; King Monkutt University of Technology, Thailand

The research aims to study/validate the family business succession model and key success factors by comparing the theory with real family business succession processes in Thailand. Seven steps of succession plan by Dr. Thieanphut along with nine important key success factors by Dr. Roongrerngsuke were validated using in-depth interviews of seven large family owned enterprises (Imperial General Foods Industry Co., Ltd, Siam 3 E Co., Ltd., Mae-Ruay Snack Food Factory Co., Ltd., Thai Asia P. E. Pipe Co., Ltd., V.P. Plastic Product (1993) Co., Ltd., Hong Seng Knitting Group (Garment) Co., Ltd., and Siam Steel International Public Company Limited). The results suggest that the succession model fits well with the Thai enterprise; on the other hand, the nine key success factors have a limited usage. Moreover, the researchers have included other key success factors suggested by the business successors in this paper.

WB-02.2 [R] Ownership and Innovative Behaviour: The Case of the South African Automotive Component Manufacturing Industry

Andre J Buys; University of Pretoria, South Africa

Global innovation networks (GINs) have evolved from global production networks (GPNs). GINs are characterized by networking across the entire spectrum of innovation activities that includes research, technology development, product development, production, distribution and sales. This study investigates the influence firm ownership has on innovative behavior. Firm ownership is defined by whether a firm is a single plant firm or part of an enterprise

group, and if part of an enterprise group, whether the firm is the head office or a subsidiary. Ownership is further defined by the ratio of domestic to foreign capital. This study analyzed the findings of an innovation survey conducted in the South African automotive component manufacturing industry. Some of the innovative behaviors that this study investigates are the innovation linkages and channels, the resources utilized for innovation, the type and importance of innovation, and the strategies employed to access local and foreign markets. This research found support for the proposition that firm ownership has an important influence on the innovative behavior of firms.

WB-02.3 [R] Human Risk Factors in Post-Implementation Phase of ERP in SMEs in India

Lakhwinder Pal Singh; National Institute of Technology, India
Sarbjit Singh; National Institute of Technology, India
N. Parera; National Institute of Technology, India

As small- and medium-scale enterprises (SMEs) are getting more customer-focused and profit driven, they are adopting tools like enterprise resource planning (ERP) systems in order to automate and integrate all of a company's business processes for the smooth functioning of the organization. Non-value adding business processes are removed, and the organizational structure is streamlined with the use of ERP systems. The study reported in this paper aims to identify, assess and suggest improvements to ERP post-implementations shortcomings due to human-related risk factors for a discrete manufacturing unit in India. The organizational human-related factors post implementation was analyzed by adopting in-depth interview and questionnaire responses as the main method of data collection. The findings identified that the success of ERP systems is hindered by resistance of users to technology change. The human factors found in the study were classified to be psychological, behavioral, incomplete training and human errors at the time of data entry. The study also indicates a strong need for change in the training structure provided by vendors in order to successfully implement the ERP system. In contrast with technical risks and disregarding the deficient business processes and business drawbacks, human-related risks due to change management techniques applied are more crucial to potential ERP failures and can have long-term implications for the success of ERP usage in manufacturing units.

WB-03 Technical Workforce - 2
Wednesday, 7/21/2010, 10:00 - 11:30
Room: Similan 1
Chair(s) François A Ravalison; University of Antananarivo

WB-03.1 [R] The Moderating Effect of Employees' Personality on the Relationship between Charismatic Leadership and Organizational Citizenship Behavior: Analysis of the High-Tech Firms in Southern Taiwan

Yuan-Duen Lee; Chang Jung Christian University, Taiwan
Shu-Hua Chiang; Chang Jung Christian University, Taiwan
Shih-Hao Chen; Chang Jung Christian University , Taiwan
Pi-Ching Chen; Chang Jung Christian University , Taiwan

This study analyzed the impact of an employees personality on the relationship between charismatic leadership and organizational citizenship behavior (OCB). This research revised the measuring scales constructed by previous scholars. Survey data were collected from 375 supervisor-subordinate dyads of the high-tech firms in Southern Taiwan Science Park (STSP), and 81 dyads of questionnaires were effectively returned. Reliability analysis, correlation analysis, and hierarchical regression analysis were adopted to test the hypotheses of this research. The results showed that charismatic leadership had a significant positive effect on OCB. Besides, employees personality traits had a moderating effect on the relationship between charismatic leadership and OCB. Some discussions on the conclusion and implications were made, and this research also offers several suggestions on management practices and directions of future research to academia and practice.

WB-03.2 [R] The Moderating Role of Cognitive Style Congruence in the Relationship between Task Conflict and Team Performance

Chia-wu Lin; National Dong-Hwa University, Taiwan
Ya-Jen Cheng; National Dong-Hwa University, Taiwan
Ling- Ling Shen; Taiwan Power Company, Taiwan
Guo-Shu Yuan; National Sun Yat-Sen University, Taiwan

This paper will explore what influences team members to complete tasks and make decisions with their members if conflict between tasks happen. The R&D team works improve technology. As team members, due to each teams responsibility, they would still approach their team performance on time. Generally, team members have many similar traits, such as intelligences, absorbency, and willingness of cooperation. The similarity-attraction theory suggests that congruence between the cognitive styles of team members may have impacts on the relationship between task conflict and team performance. We investigate the data from 38 work teams in which participants were team members and the leaders worked in organizations in which the nature of the team task involved R&D, project, and management. The analysis will use the SPSS statistical software package and show descriptive statistics, reliability as a measure of consistency. Predicting findings will indicate that task conflict may be related to team performance. However, this paper will explain whether the congruence of cognitive style had seen an enormous moderated effect between them. It is very important for technology based organizations and teams. The implications of practices and management may demonstrate what factors should be considered when there are some obstructions in team work.

WB-03.3 [A] Communication Mechanism between Scientists and Entrepreneurs

Haoshu Peng; Chinese Academy of Sciences, China

Technology transfer has been examined on more macro levels in former studies. However, communication between academia and industry on a micro level still needs to be studied. An effective communication mechanism is of key importance in technology transfer. In this study the author interviews top scientists and company owners from science parks or R&D centers in China to examine the communication strategies in searching for a cooperator from academia, their R&D cooperation, the process in evaluating a potential commercialization and communication during production. The paper gives policy implications on how to support academia-industrial cooperation and gives suggestions for how to create a more effective communication.

WB-04 Software Process Management - 1
Wednesday, 7/21/2010, 10:00 - 11:30
Room: Similan 2
Chair(s) Timothy R Anderson; PICMET

WB-04.1 [R] Managing Open Source Contributions for Software Project Sustainability

Bhuricha Deen Sethanandha; Portland State University, United States
Bart Massey; Portland State University, United States
William Jones; University of Washington, United States

The use of open source software has become a part of accepted business strategies. A primary strength of open source software is its leverage of outside innovation. All are free to take open source software and use it, evaluate it, repair it, and add new capabilities. One perceived risk of using open source software components in commercial systems is open source project sustainability. It would be expensive for the project supporting a critical open source component to fail midway through the life cycle of a commercial product. Many commercial organizations reduce this risk by contributing to the open source projects that they use. However, the "contribution barrier" for successful open source software projects is high, especially for commercial contributors. This barrier has technical and social components, both of which are exacerbated by minimal attention paid to good management practices. This paper proposes a process for managing open source software "patch" (source code and documentation change) contributions. By observation and by examination of current literature we identify key practices for patch creation, publication, discovery, review, and application. An improved patch contribution process will lower the contribution

barrier, helping to improve the sustainability of critical open source projects.

WB-04.2 [R] Limiting Practices in Developing and Managing Software-Intensive Systems: A Comparative Study

Peter Wallin; Mälardalen University, Sweden
Stefan Cedergren; Mälardalen University, Sweden
Stig Larsson; Mälardalen University, Sweden
Jakob Axelsson; Mälardalen University, Sweden

Within the automotive industry, up to 90 percent of all new features are dependent on electronics and software. Consequently, the amount of software and electronics in vehicles is rapidly increasing. The same trend has been observed in other domains, such as telecom, avionics, trains, and more. An important factor in dealing with this inherent complexity is the use of a system architecture. The architecture is typically an enabler for both efficiency and effectiveness in the development of software-intensive systems but not directly connected to the customer needs. For example, the architecture can increase the agility of upcoming product releases in order to cost effectively satisfy future customer needs. By combining two parallel multiple case studies, one focusing on the architects view, and the other one focusing on the managerial perspective, we have identified six limitations. Our results indicate that the focus is on customer requirements for the current product, on the expense of the internal requirements related to the development of the architecture and long-term profitability. Further, even if the early phases of development are identified as a success criterion, they are still not given enough attention.

WB-04.3 [R] Arranging Software Test Cases through an Optimization Method

Gary Chen; Chung Yuan Christian University, Taiwan
Jamie Rogers; University of Texas - Arlington, United States

During the software testing process, the customers would be invited to review or inspect an ongoing software product. This phase is called the in-plant test, often known as an alpha test. Typically, this test phase lasts for a very short period of time in which the software test engineers or software quality engineers rush to execute a list of software test cases in the test suite with customers. Because of the time constraint, the test cases have to be arranged in terms of test case severities, estimated test time, and customers demands. As important as the test case arrangement is, this process is mostly performed manually by the project managers and software test engineers together. As the software systems are getting more sophisticated and complex, a greater volume of test cases have to be generated, and the manual arrangement approach may not be the most efficient way to handle this. In this paper, we propose a framework for automating the process of test case arrangement and management through an optimization method. We believe that this framework will help software test engineers faced with the challenges of prioritizing test cases.

WB-05 Sustainability - 1
Wednesday, 7/21/2010, 10:00 - 11:30
Room: Arcadia Hall 1
Chair(s) Mel Horwitch; Polytechnic University

WB-05.1 [A] The Emerging Complexity of Business and Social Entrepreneurship: Two Clean Technology Ventures in New York City as Cases In Point

Mel Horwitch; Polytechnic University, United States
Bala Mulloth; Polytechnic University, United States

There appears to be a potential dichotomy in clean technology or cleantech entrepreneurship, business-oriented and social entrepreneurship. This dichotomy is studied using two representative case studies. One case is Verdant Power, which is a world leader in the development of marine renewable energy technology and project development. The other case is Green Map Systems, which is a not-for-profit organization that develops Green Maps that employ icons to indicate sustainability and related sites on its maps. The study compares these two organizations along three dimensions: technology regimes, decision-making types and kinds of overarching entrepreneurial goals. The study concludes that the cleantech entrepreneurial venue is too complex for using a simple business-versus-social dichotomy. Instead, a more contingent and a multifaceted set of dimensions have emerged to better characterize cleantech entrepreneurship. Furthermore, the diverse constellation and evolutionary dynamics of cleantech entrepreneurship initiatives, which the study uncovered, need to be recognized, better understood and nourished in order for modern entrepreneurship to play fully its varied roles in launching and sustaining a robust and powerful clean technology sector.

WB-05.2 [R] Promoting Interdisciplinary Research and Transdisciplinary Expertise for Realizing Sustainable Society

Yuya Kajikawa; University of Tokyo, Japan

Sustainability is an important concept for society, economics, and the environment, and sustainability science is launching and becoming a distinct scientific field. In sustainability science, an emphasis is put on the importance of integrating diverse disciplines and promoting transdisciplinary expertise. But how to bridge the existing gaps among disciplines and sectors? In this contribution, we illustrate the concept of network of networks as a boundary spanning motif. At first, we consider the interdisciplinary characteristics of sustainability science and discuss the key issues to integrate disciplines. By analyzing the structure of sustainability science, we found that papers focusing on common problems, tools, frameworks, and social and political aspects bridge multiple disciplines. Therefore, this research has a potential to integrate them. Then, we discuss the necessity of transdisciplinary expertise and show initiatives conducted in Japan.

WB-05.3 [R] The Relationship between Exporting Performance and the Integrated Effect of Sustainability Management R&D and Marketing

Hermann Hrdlicka; University of Sao Paulo, Brazil
Isak Kruglianskas; University of Sao Paulo, Brazil

This paper presents the findings of an empirical research using a sample of 59 large and important Brazilian firms with the objective to verify if environmental management practices can influence the their competitiveness in the international market. Because the sample used was constituted of Brazilian enterprises, most of them internationalized, it can be considered that the results reflect a reality that extrapolates the country borders. Using structural equations modeling techniques it was possible to conclude that the environmental corporate management, when integrated with R&D and marketing promotion, provides a significant relationship with export performance. Besides these important findings, some considerations regarding other relevant characteristics that can influence the competitiveness are also discussed such as: the lack of support from the high-level management, the existence of a very low awareness about the importance of sustainability, and also the existence of a weak communication about sustainability with internal and external stakeholders. Some recommendations for future research and for practitioners are also presented.

WB-06 Technology Forecasting - 1
Wednesday, 7/21/2010, 10:00 - 11:30
Room: Arcadia Hall 2
Chair(s) Martin Steinert; Center for Design Research, Stanford University

WB-06.1 [R] Strategic Foresight Methodology to Identifying Technology Trends and Business Opportunities

Juan L Amezcua-Martínez; Tecnológico de Monterrey, Campus Monterrey, Mexico
David Güemes-Castorena; Tecnológico de Monterrey, Campus Monterrey, Mexico

This research aims to synthesize a model, based on previously developed methods by UNIDO, Deutsche Bank, Siemens Technology Accelerator, among others, by using control systems logic and serving as reference for systematic planning and strategic foresight in identifying technology trends and business opportunities. This model will serve as a decision support system with a thorough environmental analysis, allowing early detection of such trends. In the first phase, methodologies such as backcasting and strategic vision set the goal of what will be prospected. In the second phase, resources and capabilities are defined using tools such as Environmental Scanning & Monitoring, Core Strategic Vision,

and SWOT among others. The third phase defines the direction based on prior information. The first control loop is made up, serving as a fast-track feedback making it adaptable to the changing environment. A fourth phase serves to define action plans and measures to achieve the objectives; this stage feeds back to keep the system updated on the progress of measures and actions taken. This model is expected to respond to the following strategic foresight basic questions: what is being sought, where the technologies are, what direction should be taken according to the current environment and how to get there.

WB-06.2 [R] Taxonomy Based Trend Discovery of Renewable Energy Technologies in Desalination and Power Generation

Gihan Dawelbait; Masdar Institute of Science and Technology, United Arab Emirates
Toufic Mezher; Masdar Institute of Science and Technology, United Arab Emirates
Wei Lee Woon; Masdar Institute of Science and Technology, United Arab Emirates
Andreas Henschel; Masdar Institute of Science and Technology, United Arab Emirates

Renewable energy (RE) technologies are increasingly viewed as critically important since the noticeable depletion of fossil fuel. Knowledge that facilitates forecasting the likely growth and consequences of emergent technologies is essential for well-informed technology management. Acquiring and analyzing such knowledge is hampered by the amount of data available in publications. In order to elucidate the advance of technologies, we want to address questions like: How many scientific articles have been published in solar energy recently? Intelligent search techniques capable of grouping semantically similar concepts are therefore needed, such that e.g. the term parabolic trough is subsumed under solar energy related technologies and hence articles about it should be included in the analysis. The novelty of this work is the deployment of a large, high quality RE-taxonomy for comprehensive trend discovery in publications and patents. We report interesting trends of renewables in two case studies: power generation and desalination techniques. While all major renewables, except geothermal, recently boomed in power generation in terms of publication volume, leading to a nearly equibalanced diversification, patents only reflect strong growth for wind and solar. Renewables in desalination, in particular reverse osmosis, are mainly solar and wind with a slight upward trend of biofuels in publications, whereas other renewables are still in the experimental stage.

WB-06.3 [A] The Foresight Model that Focuses on Political and Social

Tsai-Hua Kang; De Lin Institute of Technology, Taiwan
Jia-Horng Shieh; Hsing Wu College, Taiwan
Chien Ching Chang; National Chiao Tung University, Taiwan
Kuang-Pin Li; National Chiao Tung University, Taiwan
Li-Min Tsai; National Chiao Tung University, Taiwan

Due to global competition and rapid technological advancement, foresight has become an important method of formulating technological policies. In this study, we look at the different kinds of foresight models nd briefly analyze political and social aspects of foresight. Finally, the authors describe the Foresight Integration Model, which is based on political and social forming.

WB-07 Information Technology - 1
Wednesday, 7/21/2010, 10:00 - 11:30
Room: Lagoon Hall 1
Chair(s) Chaiho Kim; Santa Clara University

WB-07.1 [R] An Empirical Study on the Relationship between the Information Technologies, Innovation Activities and Firm Performance in Turkey

Muammer Zerenler; Selcuk University, Turkey
Mehmet Yıldız; Selcuk University, Turkey
Emel Celep; Selcuk University, Turkey

Many socio economic changes are affected by the information technology (IT) implementations and innovation as a driving force. At the same time, applications of IT activate innovation in different areas. In a firm or a specific field of an industry, technological innovations affect the performance, and also it depends on many factors such as quality, properties and standardization of the services and products. The innovation strategies such as differentiation, cost leadership, etc., will bring customer satisfaction and sustainable competition advantage to the firms. Competitive power allows a producer or a firm to get a more added value than the other competitor by offering a specific and high quality product, which the consumer is willing to pay for. The firms that use IT can offer many alternatives faster about the products and services that have more quality and are more reliable and acceptable for consumers. With the resources like the internet and computer, IT enables firms to have much flexible organization structure. The results of this empirical study indicate that IT and innovation activities have positive influences on the firms performance in Turkey.

WB-07.2 [R] Segmentation of Small Firms Based on Information Technology Usage and Absorptive Capabilities

Victoria E Erosa; Universidad Autonoma de Tamaulipas, Mexico
Pilar E Arroyo; ITESM Campus Toluca, Mexico

Small- and medium-size firms (SMEs) are recognized as being fundamental to regional economies as they represent the majority of the business base, and make large contributions to employment and gross domestic product. However, the rate of integration of SMEs into e-commerce and e-business puts them in a disadvantaged position with respect to larger organizations. The slight utilization of information technologies and systems (IT/IS) among SMEs has been explained in terms of scarce IT infrastructure, insufficient managerial and governmental support and limited technical competences. The lack of knowledge about how to effectively use IT/IS particularly refrains SMEs to advance in the implementation of e-business. This work uses a multi-case approach to explore how the acquisition, diffusion and utilization of knowledge about IT/IS is related to the usage of existing technologies and the development of internal technical capabilities. Fourteen small retailing and service firms located in a large city in Mexico were studied. The multivariate statistical analysis of the collected data shows that those SMEs that make full use of available IT/IS resources have better absorptive capabilities. This means they are able to acquire knowledge from business partners and external consultants, and share and apply this knowledge to improve IT/IS usage.

WB-07.3 [A] Exploring Information Security Practices in Thailand Using ISM-Benchmark

Chalee Vorakulpipat; NECTEC, Thailand
Siwaruk Siwamogsatham; NECTEC, Thailand
Komain Pibulyarojana; NECTEC, Thailand

In recent years, information security has become a vital focus in most organizations around the world. However, the majority of the studies on information security have been widely done to highlight successful cases in developed countries, but very few in developing countries. This paper aims to explore information security practices in the context of a developing country, Thailand. The study uses ISM-Benchmark developed by Information-technology Promotion Agency of Japan (IPA) to investigate and compare information security levels of the Thai organization with the Japanese ideal scores. In the study, the survey samples are ranged from SME to large companies. The results demonstrate the levels of information security practices and identify the problems in the information security. The study also shows the need for benchmarking information security of any organization with the best practice of the developed country.

WB-08 Technology Management in Service Industry - 2
Wednesday, 7/21/2010, 10:00 - 11:30
Room: Lagoon Hall 2
Chair(s) Robert Harmon; Portland State University

WB-08.1 [R] Examining the Trend toward a Service Economy in Information Media through Changes to Technology: Influence of Twitter on Media Companies

Yasuyoshi Aosaki; Japan Advanced Institute of Science and Technology, Japan
Taro Sugihara; Japan Advanced Institute of Science and Technology, Japan

Katsuhiro Umemoto; Japan Advanced Institute of Science and Technology, Japan

Internet services such as Twitter have emerged, and ordinary users are able to publish user-generated content that may involve primary information. User-generated content has begun to serve as an alternative to traditional information media. Since the content generated by users on Twitter is not always accurate, conventional information media therefore views its existing quality as inferior. However, user-generated content is gradually depriving conventional information media of its role with regard to being the exclusive provider of primary information. As a result, we regard and refer to Twitter as a disruptive technology that is leading to the displacement of traditional information media. As a consequence of the popularity of Twitter, conventional information media has resorted to exploiting the user-generated information existing on Twitter as a source of news through becoming involved in the Media Ecosystem. Traditional information media have begun to communicate more with users to the extent that it may be able to strengthen its role as a secondary information provider. The conventional forms of information media may also be able to help in dealing with certain unforeseen social problems. We view this as a trend that is set to continue with the conventional information media moving toward a more service-based economy.

WB-08.2 [R] Development of Tourist Information Search Behavior Model: The Case of Thailand

Theera Erawan; Asian Institute of Technology, Thailand
Donyaprueth Krairit; Asian Institute of Technology, Thailand
Vatcharaporn Esichaikul; Asian Institute of Technology, Thailand

Information search is an important part in most consumers buying decisions. Thailands main revenues rely partly on the tourism industry, one of the top industries which is significantly affected by the emergence of the Internet. Understanding tourists information search behavior could provide useful information for both government and tourism-related businesses to plan their marketing communication and distribution strategies. The main contribution of this study is to explore and refine determinants of external information search behavior in the tourism context, the context which has not been fully explored in the literature, and the features that could be used to characterize tourists external information search behavior. This study utilized a so-called three-pronged approach, an approach to cross validate among the results from the literature review, expert interviews, and an exploratory field study in order to confirm and propose a reliable conceptual framework. Findings from the three-pronged approach suggested 11 components as determinants of external information search behavior and 4 features that could be used to define tourists external information search behavior itself. Six new variables which did not exist in the literature as determinants of external information search behavior were introduced with satisfactory validity and reliability levels.

WB-08.3 [R] Near-Infrared Spectroscopy Approach for Web Based Service Marketing

Kunio Shirahada; Japan Advanced Institute of Science and Technology, Japan
Shota Imoto; Japan Advanced Institute of Science and Technology, Japan
Michitaka Kosaka; Japan Advanced Institute of Science and Technology, Japan
Takushige Katusra; Hitachi, Ltd., Japan

Although the importance of user impressions of websites has been increasing with the growing utilization rate of the Internet, evaluations of this importance have little scientific basis. We used an optical topography device based on near-infrared spectroscopy (NIRS) technology in an experiment conducted with graduate students to analyze changes in oxygen level in the brain during web browsing. In the experiment, eight students browsed 10 screen images from two Japanese inn and hot-spring websites while wearing the optical topography device (Hitachi ETG-4000) over the frontal and temporal lobes and then answered some questions about the websites. We conducted the experiment five times and obtained quantitative brain data and data on user impressions. As a result of data analysis, we clarified that human brain activity is relatively quiet when users viewed positive images of the inns, and we found a scientific relationship between elements of the hotel websites and user impression. Our study will contribute to the development of technology-based service marketing.

WD-01 New Product Development - 3

Wednesday, 7/21/2010, 13:00 - 14:30
Room: Ballroom A
Chair(s) Chen Song; TongJi University

WD-01.1 [R] Towards Integrating Perceived Customer Value in the Evaluation of Performance in Product Development

Stefan Cedergren; Mälardalen University, Sweden
Stig Larsson; Mälardalen University, Sweden
Anders Wall; ABB Corporate Research, Sweden
Christer Norström; Mälardalen University, Sweden

Product delivering companies invest resources in product development activities in order to create value. Still, when performance in product development is to be evaluated, time, cost, and quality are in focus, especially in the later stages of the development when it is expensive and difficult to make any changes. Time, cost, and quality are important dimensions of performance, but they are not revealing the complete picture. Missing is the value perspective. This paper outlines a method for how perceived customer value can be used to evaluate performance in product development and describes how it is verified through a case study. By using the perceived customer value of requirements, the value propagation throughout the development is possible to monitor based on both market and scope changes. In addition, a measure of productivity can be calculated by relating the perceived value to the spent effort. This information is used in order to visualize the value propagation and performance during the development. Hence, through this method it is possible to evaluate the productivity of activities from initial ideas to a final product. The paper is concluded with a discussion of managerial implications and how this method contributes to theory.

WD-01.3 [R] Involving Customers in NPD Process: A Comparison of Two Telecommunication Companies in Taiwan

Chien Chiang Lin; Shih Hsin University, Taiwan
Yun Shan Huang; Shih Hsin University, Taiwan
Wei Che Hsu; Shih Hsin University, Taiwan

Competition has become a common phenomenon in the global marketplace; innovation seems to be the most promising weapon for practitioners to sustain a competitive advantage under the pressure of fierce rivalry. Traditional innovation models, however, are unable to quickly and accurately meet the needs of customers. Involving customers in the product development process is then employed to reduce the risk and accelerate the speed of introducing new products/services. From previous studies, four types of customers who commonly participated in the processes of new product/service development were categorized. In order to extend the understanding of customer participation in the new product/service development process, in-depth interviews were used to collect data from two Taiwanese telecommunications companies. Comparisons between the two companies on their new product development processes and the involvement of different types of customers were discussed. Results of this study could help practitioners reconsider the pros and cons of involving customers in the new product development process. Academia could also benefit from understanding the utilization of customer participation from the practitioners perspective.

WD-01.4 [R] The Influence of Entrepreneurial Creativity, Work Experiences, Customer's and Competitor's Information, and Scientific Information on Product and Process Innovations

Igor Prodan; University of Ljubljana, Slovenia
Branka Ahlin; University of Ljubljana, Slovenia
Alenka Slavec; University of Ljubljana, Slovenia

This study developed and tested a model of the influence of entrepreneurial creativity, work experiences, customer and competitors information, and scientific information on product and process innovations. The model was tested on 497 usable responses from mail survey

data from a sample of small manufacturing Slovenian firms. The structural relationships in the model were estimated using the EQS multivariate software. The results revealed that product and process innovations are both influenced by customers and competitors information, scientific information and entrepreneurial creativity (all statistically significant at 5 percent level). Although work experiences were found to be less important, the influence of work experience on product and process innovations was statistically significant at 10 percent level. While the product innovations variance explained was 43 percent, the process innovations variance explained was 27 percent.

WD-02 Technology Management in Service Industry - 3
Wednesday, 7/21/2010, 13:00 - 14:30
Room: Ballroom B
Chair(s) Bertha T Jimenez; NYU-Poly

WD-02.1 [R] Service Absorptive Capacity: Its Evolution and Implications for Innovation

Bertha Jimenez; Polytechnic Institute of New York University, United States
Bojan Angelov; Polytechnic Institute of New York University, United States
Bharat Rao; Polytechnic Institute of New York University, United States

The concept of absorptive capacity has been part of the strategy and innovation discourse for a few decades. As industry and business practices have evolved, so has the understanding of the mechanisms responsible for developing and growing the absorptive capacity of contemporary organizations. In this paper, we trace the evolution of this concept and its operationalization and measurement. We particularly investigate how absorptive capacity can be used as a potential anchor of innovation research in service industries. We suggested the conceptualization of a service absorptive capacity (SACAP) and propose different measures that could aid to this conceptualization. We also provide an alternative to the predominant focus on functional characteristics and research and development practices in innovation studies to date.

WD-02.2 [R] The Service Design Strategy of Manufacturing Service Industry

Yiche Grace Chen; Yuan Ze University, Taiwan
Chih Ming Hsu; Yuan Ze University, Taiwan
Zi-Hui Chen; Yuan Ze University, Taiwan

Along with the changes of economic structure, Taiwanese manufacturing firms are facing unfavorable problems such as increasing operating costs and the matured product life cycle. In order to gain competitiveness, many manufacturers in Taiwan are transforming into manufacturing service industries to satisfy customer needs. Many manufacturers are moving toward providing high value-added services by service innovation. Previous studies argue that service design is an important issue in service innovation. After a literature review, this study presents a new framework for service design as a means and an end tool for modeling, designing, and developing the new manufacturing services. According to the proposed framework, service design covers service concept, customer value and science and technology. This paper applies the qualitative case study method to discuss how the manufacturers apply service design to fulfill customer needs. Next, a qualitative single case study is reported in which a troublesome service design concept was surveyed through five extensive interviews. We provide not only an original perspective on service design in the manufacturing industry, but also a common implicit view that pure manufactures can shift to service-oriented manufactures by adding service for their customers. Our results also indicate that service differentiation and functional value are the most important customer values which were considered by experienced managers.

WD-02.3 [R] The Analysis of Service Acceptance Framework for Social Games Based on Extensive Technology Acceptance Model

Po-Yu Chen; National Chiao-Tung University, Taiwan
Chia-Chi Chang; National Chiao-Tung University, Taiwan

The social networking website has been one of the most popular Internet websites in recent years. Lately, social games such as “happy farm” drew a lot of attention and accumulated millions of players in a short period of time. The popularity of social games is changing the ecosystem of online games. Companies in this industry have to be concerned about the impact of it to keep their competitiveness. Technology acceptance model (TAM) has been pervasively used by researchers in that this model systematically helps the users to find out the process of user behaviors, and explores the impact of external variables which change the attitude and desire of users to adopt new technologies. This study reviewed the behaviors of social game players and used perceived enjoyment, perceived attractiveness, social norms, and platform service and corporate image as the external variables, and intention toward playing social games, customer preference, and customer loyalty as the dependent variables in the TAM for social games. DEMATEL is used as the analysis tool in this study. The result shows that social norms and perceived enjoyment are the top two factors that can help to improve the popularity of social games. This study provides a reference to the companies in the social game business and helps them to offer a more popular social game to players.

WD-03 TUTORIAL: Real Project Costs: What You Should Know and Why No One Listens!
Wednesday, 7/21/2010, 13:00 - 14:30
Room: Similan 1
Speaker(s) Jeffrey S. Busch, PMP; Portland State University

It is difficult to pick up an article, newsprint or periodical that does not discuss the financial distress of businesses during these economic times. This abstract is not excused. “Do less more with less” and “do less with less” is a popular CIO (Chief Information Officer magazine) slogan for the semiconductor, IT and cyberspace industries. The forecast for 2010 does not include a significant jump back to 2007 budget levels. Aptly applied, the cut-list for active and proposed projects is getting shorter. Prioritization of only the highest ranked, most ROI or business-critical cost saving projects are making the cut. To quote the CEO of CIO: “Based on the current economic conditions, everything within IT is being seriously re-examined. Efficiency and ROI continue to be top-of-mind, while increasing work force productivity and innovation are equally essential.” In other words, what alternative solutions can free businesses from their systems and processes rather then just the traditional approaches. A CIO contributor is stating that it is time to take a second look at where you are spending money. So, if you are in technology management and your business initiative is economic growth but it does not spend any money, what do you? Businesses need projects to be innovative, businesses need projects to remain competitive, businesses need projects to be efficient and projects cost money. So, how much are businesses willing to spend to achieve fiscal initiatives? Most will put the squeeze on the costly and outrageous, but do they know how much they are even spending on the obvious, must-do or business critical projects? Probably not, and they are not listening. This tutorial will present what we should know and can do when it comes to project costs. It will further define cost essentials, lay out various methods for estimating and forecasting costs, and explore business processes that support the financial aspects of projects.

WD-04 Software Process Management - 2
Wednesday, 7/21/2010, 13:00 - 14:30
Room: Similan 2
Chair(s) Robert Harmon; Portland State University

WD-04.1 [R] Integrating Lean Principles with Value Based Software Engineering

David Raffo; Portland State University, United States
Merwan Mehta; East Carolina University, United States
David J Anderson; Anderson & Associates, United States
Robert R Harmon; Portland State University, United States

Lean Six-sigma principles and methods have been successfully applied in a variety of industries. Many of the core principles of Lean Six-sigma can be applied to software development to dramatically improve performance with some industry specific adaptations. In this regard, Lean Six-sigma principles can be made to further leverage the benefits of software

engineering best practices to improve work flow and the tactical management of the project. The Value Based Software Engineering (VBSE) process as practiced today begins the software development lifecycle (SDLC) with a sophisticated customer value analysis (CVA), which is coupled with a quantitative evaluation of pricing and profitability options followed by development of the software. The CVA yields a wealth of information not only for product features, but also for improving all processes within the organization that touch the customer. This paper seeks to present and articulate how applicable Lean Six-sigma principles can be coupled with the VBSE to improve the SDLC by improving the identification and delivery of customer value as well as the reduction of wasted resources. The net result is to substantially enhance the VBSE SDLC and the organizations overall ability to deliver value.

WD-04.2 [R] Measuring E-CRM Implementation and Outcomes from the Customers' Perspectives

Phavaphan Sivaraks; Asian Institute of Technology, Thailand
Donyaprueth Krairit; Asian Institute of Technology, Thailand
Vatcharaporn Esichaikul; Asian Institute of Technology, Thailand

This research attempts to examine and measure outcomes of e-CRM system implementation in the Thai Banking industry. The research is divided into two main sections. The first section is based on a qualitative approach to define e-CRM implementation in Thai banks. The second section uses a quantitative approach to determine the relationships between e-CRM implementation and outcomes from the customers point of view. The contribution of this research lies in the fact that most e-CRM implementations are done in the back-office part, which cannot be directly seen or recognized by the customers, so a new construct called e-CRM Service attribute was introduced in this research in order to enable the measurement of e-CRM outcomes from the customers perspectives. From the 13 constructs that have been collected from the literature, the exploratory factor analysis was performed and the results showed that the outcomes of e-CRM implementation from the customers perspective can be grouped into three factors. The first one is the information factor, the second one is convenience and the third one is communication channel factor. In addition, the T-test was also employed to test the differences in e-CRM outcomes from the customers perspectives between the customers of the banks that implemented e-CRM and those that did not.

WD-04.3 [R] Improving the System Architecting Process through the Use of Lean Tools

Håkan Gustavsson; Mälardalen University, Sweden
Jakob Axelsson; Mälardalen University, Sweden

The impact of embedded systems within the automotive industry has grown very rapidly and is today influencing most parts of the product development process. This technological change puts high demands on the development process in order for the company to stay competitive. The architecting process is performed during the early phases of the development process when uncertainty is very high. The architecting process will not create immediate value to the end customer, but rather create the architecture on which value in terms of product features can be developed. The architecture will enable value creation when working properly or, in the worst case, prevent value creation. Lean is a product development philosophy that aims at creating value for the end customer. A lean tool used to improve the value creation within a process is Value Stream Mapping (VSM). VSM has in this work been adapted and evaluated to analyze and identify improvements of the architecting process within embedded systems development. In this paper we present practical experiences from using this adapted VSM. The evaluation was conducted through interviews at two automotive manufacturers. VSM is shown to be a valuable tool to identify waste and thereby improve the architecting process.

WD-04.4 [R] Proposal of Agent's Software for Support Competence Management Process

Dani J Czelusniak; Universidade Federal de Santa Catarina, Brazil
Aline F de Abreu; Universidade Federal de Santa Catarina, Brazil
Dario E Dergint; Universidade Tecnologica Federal do Parana, Brazil
Kazuo Hatakeyama; Universidade Tecnologica Federal do Parana, Brazil

The goal of this work is to develop and test a new software archetype, to aid the competence management process in post-graduate of Production Engineering courses. This system will be designed using JADE Agent Framework, to read and analyze XML data. Those technologies have been used to build an innovative environment for software building. The research methodology used in this scientific work is the bibliographical revision for appraising the theories as competence management and agent systems and the state of art when making the proposal, development and tests of the software. This work exposes that the agent-based methodology provides a new way to collect data, for being flexible, and to offer forms to deal with human characteristics beings in a innovative form, creating modular solutions that have the capacity to deal with complex databases in an associative form.

WD-05 Technical Workforce - 3
Wednesday, 7/21/2010, 13:00 - 14:30
Room: Arcadia Hall 1
Chair(s) Richard V Weeks; University of Pretoria

WD-05.1 [A] Technological and Management Skills Development an Imperative for Economic Growth: A South African Perspective

Richard V Weeks; University of Pretoria, South Africa
Siebert Benade; University of Pretoria, South Africa

The ramifications of the global economic meltdown have exposed the economic vulnerability and the underlying structural flaws in the economy of many nations, and South Africa as a developing nation is certainly no exception to the rule. It is suggested in this paper that one such flaw is the skills paradox that exists, in that while the South Africa has a very significant unemployment problem it simultaneously does not have the appropriate technological and managerial skills required by business and industry. A case in point is the fact that while services account for over 65 percent of the South African gross domestic product, the Graduate School of Technology Management, at the University of Pretoria, is the only academic institution in the country that currently presents courses in services science within an engineering and technological context. The objective in this paper is therefore to explore the role of technology and skills development as an imperative for economic recovery and growth, from a South African perspective with reference to global trends. The methodology applied in realizing this objective essentially constitutes a literature research that is limited in depth of content but not in scope. As such the study underpinning this paper is deemed to be literature based and analytically descriptive in nature.

WD-05.2 [R] The Productivity and Career Development of Women in Science and Technology

Ying-Chyi Chou; Tunghai University, Taiwan
Hsin-Yi Yen; Feng Chia University, Taiwan
Pao-Long Chang; Feng Chia University, Taiwan

In the 21st century the role of women in science and technological (WIST) field is very important. Women are a technical workforce in the labor market. Many countries are actively promoting policies of women in higher education and R&D careers. Utilization of the talents of women should not be viewed only from the perspective of gender equity. In the rapid economic development today, WISTs productivity and career development must be understood. This research paper is to understand the contribution of WIST and suggest organization that provides suitable career development programs to reduce their intention to leave. The goal is increasing WISTs visibility and participation in science and technological field. The principal theme presented in the paper is the careers of women in science and technology (WIST) in order to evaluate the career gaps, which are the differences between career needs and career development programs. Moreover, it examines the relationship of career development gap and turnover intention.

WD-05.3 [R] Exploration of the Methods Used by Civil Engineering Organizations in South Africa to Overcome the Problems Presented by the Skills Shortage

J. Van der Merwe; University of Pretoria, South Africa
Marie-Louise Barry; University of Pretoria, South Africa

South Africa is currently experiencing a shortage of skilled personnel, especially in the civil engineering sector. There are currently approximately 15,000 civil engineering professionals in South Arica with estimates indicating that between 3,000 and 6,000 vacancies exist. The reasons for the shortage include: lack of proper mathematics and science education, emigration and early retirement. The purpose of this research study is to investigate the extent of the skills shortage in the civil engineering consulting industry, the effect that it is having on the abilities of consulting civil engineering organizations in South Africa to execute projects successfully, and the remedial action they have taken to alleviate this problem. The survey results indicate that organizations are resorting to headhunting to fill their vacancies and that engineers are using this head hunting approach to their own advantage to ensure the best salaries for themselves. This, however, does not solve the long-term problem. Training of the current workforce is the preferred method to alleviate the skills gap. Increased remuneration, staff bonuses and promotions are used to retain their current workforce, while increased recruitment activities, staff referral bonuses, increased remuneration and immigrants are used to alleviate staff recruitment difficulties. In the short term, work is being outsourced, non-technical staff members are better utilized, and staff members are encouraged to work longer hours.

WD-06 Ph.D. Colloquium - 1
Wednesday, 7/21/2010, 13:00 - 14:30
Room: Arcadia Hall 2
Chair: Charles M Weber; Portland State University

The "PICMET Ph.D. Colloquium - 1" is targeted at students in all stages of the Ph.D. process, as well as recent graduates. Through guest lectures and workshop discussions, we will cover various aspects of PhD education and career opportunities in engineering and technology management. Guest lectures will provide a starting point for workshop discussions. Workshops will tackle topics the participants are most interested in. They provide a unique opportunity to meet colleagues, share experiences and ideas, and network with students and faculty from different countries and university systems. We encourage students in all stages of the Ph.D. process, as well as recent graduates, to join us. The discussions will continue in "Ph.D. Colloquium - 2" (see WE-06).

WE-01 Technology Forecasting - 1
Wednesday, 7/21/2010, 15:00 - 16:30
Room: Ballroom A
Chair(s) Tugrul U Daim; Portland State University

WE-01.1 [R] Biomedical Technology: A Case Study of Forecasting in Pulsed Electro Magnetic Field Therapy

Leon Pretorius; University of Pretoria, South Africa
Dietmar H Winzker; University of Pretoria, South Africa

Forecasting emerging biomedical therapy technologies as well the rate of diffusion of resultant biomedical products can be beneficial in the context of management of technology. Techniques such as bibliometric analysis and the Bass diffusion model are utilized in this paper to assess the growth rate and market penetration of pulsed electromagnetic field therapy as a technology. The penetration and growth rate of user acceptance of the technology in a global context are simulated across a 15-year period. The technology forecasting model is also used in a case study to simulate the penetration of a product using 10 years medical application data of a patented pulsed electromagnetic field for biomedical therapy application in the global context. Useful correlation between bibliometric data for PEMF and real data for the case study is illustrated. Aspects of a holistic management model that was developed for high technology companies are invoked in the practical realization of the professional paradigm shift required when an emerging biomedical therapy technology is in the process of becoming main stream.

WE-01.2 [R] Scrutinizing Gartner's Hype Cycle Approach

Martin Steinert; Stanford University, United States
Larry Leifer; Stanford University, United States

This paper scrutinizes the validity of the Gartners hype cycle approach by means of in-depth theoretical discussion and empirical analysis. After presenting Gartners model and its strong immanent influence on large companies technology strategy and investment decisions, we conduct an in-depth analysis of its two underlying theories, the expectation hype and the technology s-curves. In the next stage, we analyze a longitudinal combination of actual hype cycle reports for the energy and utility sector 2003-2009. Additionally we observe the 46 inherent technologies and their methodological treatment more closely. In a last step, the hype cycles results for three example technologies: tidal power, Integrated Gasification Combined Cycle (IGCC) and photovoltaic generation have been tested empirically in terms of visibility (news article count) and user interest (search requests). Based on comparing the empirical results with the current methodological setup and the analysis procedure of Gartners hype cycle model, we must strongly criticize the existing approach. We suggest improvements in the hype cycle methodology by introducing an underlying mathematical model relation that would enable Gartner to quantitatively operationalize their analyses. Theoretical and empirically devised observations, propositions and aims for future research are elaborated throughout the paper and summarized in the last section.

WE-01.3 [R] Difficulties in R&D Target-Setting Addressed through Technology Forecasting Using Data Envelopment Analysis

Ann-Marie Lamb; Portland State University, United States
Timothy Anderson; Portland State University, United States
Tugrul U Daim; Portland State University, United States

While multiple studies mention the difficulty of R&D target-setting, few studies exist that bring together reasons for these difficulties; nor do they delve deeply into addressing this issue in detail. Additionally, there are many studies conducted on single or subsets of commercial airplane technology, market, and economic parameters; but few have been conducted from a combined critical technological performance parameter perspective. This paper provides what appears to be one of the first studies outlining reasons for R&D target-setting difficulties through a literature review; it also provides the first set of analyses tied to a larger study applying a quantitative method addressing these difficulties. An emerging operations research method, technology forecasting using data envelopment analysis (TFDEA), was used for this set of initial results, including determining the state-of-art in commercial airplane technology. This is the first time TFDEA has been used as a focus for addressing R&D.

WE-02 Information Technology - 2
Wednesday, 7/21/2010, 15:00 - 16:30
Room: Ballroom B
Chair(s) Alisa Kongthon; National Electronics & Computer Technology Center

WE-02.1 [R] A Study of Internet Penetration Percents of Africa Using Digital Divide Models

Chaiho Kim; Santa Clara University, United States

While per capital GDP and other income/wealth related variables play significant roles in explaining variations in the Internet Penetration Percents (IPPs), they often fail to explain some significant fractions of the variations. Studies then added other telecommunication\ICT and socio-cultural variables to see whether some subset of them can significantly increase the fractions of variations explained. In this study we pursue a different approach. By examining the XY graphs between the IPPs and GDP-PPP, we try to spot clusters of countries either above or below the regression lines. Next we create zero-one variables for each identified cluster to see if it is statistically significant. If that is the case, we test if one or more of ICT and socio-cultural variables can explain it. If that fails, we conclude that a variable representing the cluster must be added to the model. Our approach will explain at least as much or more than the traditional approach.

WE-02.2 [R] The Differences between the Suppliers and the Customers'

Business Cultures and Their Impact on the Result of an IT Project

Kari K Lilja; Tampere University of Technology, Finland
Hannu Jaakkola; Tampere University of Technology, Finland

The aim of this study was to find out what kind of impact differences in the customers and the suppliers business cultures have on the success of an ERP project. Twenty-five different projects over a period of 22 years were analyzed using the information available. Fourteen of them were selected for survey, and finally four key persons representing the supplier as well as four key persons representing the customer, all with long experience, were interviewed. The survey was conducted using a form with 103 claims concerning business culture, projects, and attitude to colleagues and working, from the viewpoint of both customer and supplier. Business culture seems to influence the success of an ERP project. To ensure the success of the project, the customer and the supplier should be of equal size and have the same type of juridical form and ownership. The supplier should be less conservative than the customer and the suppliers personnel should value their free time less than the customers personnel do. Both should have simple organizations where a worker belongs to one team or department only and has one immediate superior only. Power and responsibility should be balanced, and project managers should have enough power.

WE-02.3 [A] The Analysis of Science & Technology Policy-Making Methods of Iran's Information Technology

Bahman Shahamat; Islamic Azad University, Iran
Farhad Dalghpoush; Iran Islamic Republic Parliament, Iran

In recent decades, the world watched dramatic developments in the field of information technology (IT). And technological developments continue to increase. Iran developed powerful technologies such as IT excellence years ago with the development of S&T policies. On the other hand, Iran has been developing technologies to keep pace with global developments in recent decades, and new approaches to S&T policy have taken place. Islamic Republic of Iran (IRI), as one of the countries in the field of superior technology in the last decade, has witnessed remarkable achievements. Science and Technology (S&T) policy as basis are to identify potential and to support the drawing direction in the development of a country. Iran is considered a valuable step. Iran in the field of IT with S&T policy is to support the move in this area has been selected. In this study, a researcher intends to identify ways S&T policy in the field of IT to Iran, analysis it, and ultimately paid with informed analysis of the strengths and weaknesses mentioned policymaking method can also provide a way to supplement in the field of S&T policy and IT field in Iran is paid.

WE-03 Project/Program Management - 2
Wednesday, 7/21/2010, 15:00 - 16:30
Room: Similan 1
Chair(s) Dov Dvir; Ben-Gurion University

WE-03.1 [R] The Enablers of Project Management Practice in Technological Industry

Supachart Iamratanakul; Kasetsart University/Asian Institute of Technology, Thailand
Ravi Shankar; Indian Institute of Technology, India
Yuosre Badir; Asian Institute of Technology, Thailand
Nicholas J Dimmitt; Asian Institute of Technology, Thailand

The best practices in project management are defined by looking at the enablers that worked well for a company and most likely will continue to work well in many future projects. However, the enablers for one project from a particular industry may be different from another. The present study focuses on Thailand's electronics industry to identify its enablers and understand mutual relationships among these enablers. Few enablers supporting other enablers are driving enablers, and those which are most influenced by others are dependent enablers. Interpretive structural modeling (ISM) methodology has been applied to investigate the mutual relationship among these enablers. The results show that there is an enabler, specifically the relationship with clients, being the most significant of enablers, and therefore deserves serious attention from management. The study concludes with a direction for future research.

WE-03.2 [R] Interdependency Management in Project Portfolio Management: How to Implement Required Procedures

Mait Rungi; Lappeenranta University of Technology, Finland

This work investigates interdependencies between projects. Interdependency management is used to make project selection and review the process more effectively in the project portfolio management. Usage of interdependencies also helps to increase success. Interdependencies can be human resources, technological, and/or market -based. Despite having its roots in the 1960s and its relatedness to famous theories, the phenomenon is still less researched in practice, however, in most companies (91 percent) that use it. This research applies the triangulation method, electronic surveys (288 and 39 respondents) and multiple-case study (nine companies). Research concentrated on small to large companies, mostly from construction, engineering, ICT, and machinery industries. Analysis has shown that companies are aware of the interdependency issue in general, but they lack detailed knowledge. Implementing the required procedures is hard to achieve, especially among smaller companies. Companies complain about the difficulties in implementing interdependency procedures and evaluating them. This paper presents results on how companies have implemented working solutions to manage interdependencies on a daily bases. In most cases, initiative grew out inside the company (mostly due to the human resource or quality of information issues); cost pressures were not the main issue.

WE-03.3 [R] Factors Affecting Successful Project Management of Technology-Intense Projects

Ulrik Franke; KTH, Royal Institute of Technology, Sweden
Pia Gustafsson; KTH, Royal Institute of Technology, Sweden
David M Höök; KTH, Royal Institute of Technology, Sweden
Joakim Lilliesköld; KTH, Royal Institute of Technology, Sweden

Today, engineering and other technology-intense businesses are increasingly carried out in project form. This allows better use of scarce resources, a simplified decision-making process as well as specific organization forms being tailored to the task at hand. However, despite these advantages, complex industrial projects often fail in the sense that budgets, time-frames and customer requirements are not met. Organizations also spend lots of money on introducing project models and certifying their project managers. Are these actions really efficient, i.e. do they lead to improved management of projects? The aim of this article is to describe the impact of (i) use of project model, (ii) project manager certification, and (iii) size of organization on (a) employment of risk analysis, (b) existence of project sponsor, (c) existence of steering committee, and (d) existence of project manager task description, respectively. This article presents correlations derived from semi-structured interviews (N=59) with project managers of technology-centered projects from several countries. Two statistically significant features are found: between the use of a project models and the existence of steering committee and between the use of a project model and the existence of a project manager task description.

WE-05 Innovation Management - 4
Wednesday, 7/21/2010, 15:00 - 16:30
Room: Arcadia Hall 1
Chair(s) Deok S Yim; Gyeonggi Research Institute

WE-05.1 [R] Advantage of Innovation Creation in Family Business and Implications to Incumbents

Masanori Namba; Ritsumeikan Asia Pacific University, Japan

In this paper a family business is defined as "a business that is controlled by the founding family. The aim of this paper is to clarify the unique advantages of family businesses in innovation creation, especially in radical innovation, compared to those of non-family businesses. The data for this study is collected from secondary sources and from interviews with top managements and managers of the companies analyzed as case studies.

WE-05.2 [R] Creating and Managing Regional Innovation Network in Korea

Deok S Yim; Gyeonggi Research Institute, Korea, South
Seung Lee; Gyeonggi Science & Technology Center, Korea, South
Soojin Kim; Gyeonggi Science & Technology Center , Korea, South

The importance of networks among universities, industries and research institutes cannot be overemphasized. In the paper, the concept of the university, industry, and research institute network was briefly reviewed, and a policy case study was done for the Gyeonggi Province in Korea. In the Gyeonggi Province, the Industrial Innovation Cluster Committee (IICC) policy was developed to promote the network among the industry, university and research institute. The IICC is approved by regional government with financial and managerial support. The policy brought many positive effects in terms of R&D and information exchange. However, there are also some shortcomings. It is required to support the early creation of human network by providing more events and opportunities for the members of IICC to participate. Even with the risk of generalization, the experience of IICC can be applied to other regions and countries for the regional innovation promotion.

WE-05.3 [R] Exploring Formal Programmes Supporting Pre-Competitive Research Collaboration in Science & Technology in European Research Area

Ruslan Rakhmatullin; Trinity College, Ireland
Louis Brennan; Trinity College, Ireland

At the Lisbon Summit in 2000, the European Union (EU) Heads of States confirmed that knowledge and innovation are vital to Europes growth and agreed to make the EU the most competitive knowledge-driven economy. The EUs ability to facilitate innovation by strengthening its research capacities is central to achieving this goal. Some of the practical initiatives under this innovation policy determined at the Lisbon Summit integrate research capacities already existing in individual states through pan-European participation in collaborative projects in science and technology. The EU is financing a number of formal pre-competitive networking programs aiming at a better deployment of existing national research capacities via their inclusion in joint research initiatives. Although there is a general consensus that increasing levels of collaboration amongst researchers produce better results, the issue of research networking and of related research outcomes continues to generate debate with a wide variety of views on what roles such programs play and their general implications for research and scientific performance. This paper explores whether such formal networking programs contribute to facilitating innovation in the European Research Area (ERA) by enabling science and technology (S&T) participants to achieve anticipated research outcomes from their involvement in such programs.

WE-05.4 [R] Network Resources and the Innovation Performance: Evidence from Chinese Manufacturing Firms

Suli Zheng; Zhejiang University, China
Xianfeng Pan; Huaxin Consulting Co., Ltd, China

The advance of globalization has deeply changed the form of competition and the resource base of firms. At the same time, the forming and development of a global production network opened an opportunity window for Chinese firms to accumulate new resources and enhance their capabilities. Extending prior research on network resource and innovation, this paper first elaborates a theoretical framework in which firms network resources affects innovation performance through technological capabilities and relative bargaining power. Then a survey was taken out in Chinese domestic firms engaging in global production networks. We used hierarchical regressions to test the mechanism of network resources and innovation performance. Results showed that network resources are important sources of competitive advantage. However, the effect of network resources on a firms innovation performance was rather complicate: besides direct influences, the effect on innovation performance was partly achieved through the mediating role of technological capability and relative bargaining power. From the point of value creation, accessed resources directly enhanced innovation performance and embedded resources facilitate the technological capability and hence enhanced innovation performance. From the point of value capturing, excess use of accessed resources will cause dependency on partner firms and reduce the proportion of value appreciated by the focal firm.

WE-06 Ph.D. Colloquium - 2

Wednesday, 7/21/2010, 15:00 - 16:30
Room: Arcadia Hall 2
Chair: Charles M Weber; Portland State University

The "PICMET Ph.D. Colloquium - 2" continues the discussions (see WD-06) targeted at students in all stages of the Ph.D. process, as well as recent graduates. Through guest lectures and workshop discussions, we will cover various aspects of PhD education and career opportunities in engineering and technology management. Guest lectures will provide a starting point for workshop discussions. Workshops will tackle topics the participants are most interested in. They provide a unique opportunity to meet colleagues, share experiences and ideas, and network with students and faculty from different countries and university systems. We encourage students in all stages of the Ph.D. process, as well as recent graduates, to join us.

WF-01 Emerging Technologies - 1

Wednesday, 7/21/2010, 17:00 - 18:30
Room: Ballroom A
Chair(s) Simon J Ford; University of Cambridge

WF-01.1 [A] Managing New Technologies for Resource Efficient Innovations: Results from Current Studies

Dieter Spath; Fraunhofer Institute for Industrial Engineering, Germany
Nico Pastewski; Fraunhofer Gesellschaft, Germany
Claus Lang-Koetz; Fraunhofer Institute for Industrial Engineering, Germany

To continue to enjoy prosperity while not exceeding environmental, social and economic limits, it is becoming necessary to simultaneously pursue business growth and reduced environmental degradation by substantially increasing the efficiency of natural resource usage. Many incremental approaches to optimizing resource efficiency are available. Businesses also need to consider potentially disruptive major step changes offered by emerging technologies that create new options for resource efficient solutions. Technology Management addresses the need to analyze the specific resource efficiency potential of a technology, relevant technological trends and opportunities for creativity when searching for new product ideas. It can help design resource efficient industries that have lower costs, increased security of raw material supply and reduced environmental impact. Hence, Technology Management can be the basis for resource efficient innovations that improve productivity and open up new markets. In the following article the authors present an overview of new resource efficient technologies from a macroeconomic perspective and subsequently explore specific applications and implementation options applying nanotechnologies. Furthermore, the article outlines a method for identifying and evaluating resource efficient technologies in businesses by applying Technology Management approaches. Finally, the process of resource efficient technology development is defined through a solar cell technology case study.

WF-01.2 [R] The Dynamics of Industrial Emergence

Simon J Ford; University of Cambridge, United Kingdom
Michèle Routley; University of Cambridge, United Kingdom
Rob Phaal; University of Cambridge, United Kingdom

The need to stimulate, identify and nurture new industries is a prominent challenge in advanced economies. While basic science represents a valuable source of new ideas and opportunities, it can often take decades before this science finally finds application in the market. While numerous studies have to date focused on aspects of industrial evolution (e.g. innovation, internationalization, new product introduction, technological lifecycles and emerging technologies), far fewer have focused on technology-based industrial emergence. It is clear that if assistance is to be provided to firms and industrial policymakers attempting to navigate industrial emergence, then we need an improved understanding of the charac-

teristics and dynamics of this phenomenon. Accordingly, this paper reviews published work from a range of disparate disciplinesevolutionary theory, social construction of technology (SCOT), complexity science, industrial dynamics and technology managementto identify these dynamics. Through this review we conceptualize industrial emergence as a co-evolutionary process in which nonlinear dynamics operate. Industrial emergence is sensitive to the initial availability of resources and the market applications, with growth dependent on the supply-demand coupling, agents actions to reduce uncertainty and catalytic events. Through synthesizing these key dynamics, we go on to propose a conceptual model for industrial emergence.

WF-01.3 [R] Employing Emerging Technologies

Suzanne Bodevin; University of Notre Dame, United States
Tam Suttikul; Silpakorn University Research and Development Inst, Thailand

The World Wide Web created new opportunities for industry applications in general and service applications in particular. Two approaches are currently in use: one approach comprises devising web-based systems, both new and converted ones. The second approach encompasses all conversion types of existing systems. Our objective is twofold: First, we propose a taxonomy for the different types of systems used in the service industry, presenting their characterizations, advantages and disadvantages. Second, we present an example of an Advanced Hybrid Model with applications in the service sector.

WF-02 Information Technology - 3
Wednesday, 7/21/2010, 17:00 - 18:30
Room: Ballroom B
Chair(s) Chaiho Kim; Santa Clara University

WF-02.1 [R] Using an Opinion Mining Approach to Exploit Web Content in Order to Improve Customer Relationship Management

Alisa Kongthon; National Electronics & Computer Technology Center, Thailand
Niran Angkawattanawit; National Electronics & Computer Technology Center, Thailand
Chatchawal Sangkeettrakarn; National Electronics & Computer Technology Center, Thailand
Pornpimon Palingoon; National Electronics & Computer Technology Center, Thailand
Choochart Haruechaiyasak; National Electronics & Computer Technology Center, Thailand

A traditional market survey typically seeks out customers opinions using voluntary questionnaires or focus group interviews. The surveys perceived and actual reliability could be limited by the number of customers who choose to respond, bias inherent in the wording of the questions or the subjects interpretation regarding the information being sought. Online opinion resources such as review sites, forums, discussion groups and blogs are available with increasing variety and popularity. Companies can now apply information retrieval, natural language processing and machine learning techniques to automatically and more objectively identify and understand the opinions of their customers. In this paper, we present an approach to analyze customers opinions regarding the hotels in Thailand. Such results can be used to determine public perceptions regarding selected hotels in order to allow the business to better understand customer satisfaction.

WF-02.2 [R] Knowledge or Memory: What is the Right Choice about Information Technology Concerns?

Jose Manuel M Cardenas; University of Sao Paulo, Brazil
Mauro M Spinola; University of Sao Paulo, Brazil

Technology approaches, especially in terms of information technology, have significant importance when knowledge management is assessed. However, the manner of managing knowledge generates a gap in the quality of its use. Generated knowledge is appreciated, by knowledge management systems like a database and, on the other hand, like memory processes by knowledge based systems. In this paper the core question is the difference between technology for knowledge management systems and organizational memory systems. Specific cases were reviewed, aiming to explain and elicit specific features from each kind of system in order to help to choose the better information technology facilities, in knowledge management concerns. As a conclusion, the most important feature about this choice is still the human affair. Both knowledge management systems and organizational memory systems need an understanding of the human capabilities in order to be a right choice and enhance the implantation process.

WF-02.3 [R] Information Technology as an Enabler for Mass Customization Strategy: Integrating Customer and Organization

Kumiko Kissimoto; USP - Universidade de São Paulo, Brazil
Fernando Laurindo; USP - Universidade de São Paulo, Brazil

Mass customization is a strategy adopted by organizations in order to offer customized goods and services to customers. The understanding of customers preferences and their demands for personalization about one product or service and then translating it to the product design and research team is a key point to make a mass customization strategy work. In this context, information technology (IT) can represent a great enabler for mass customization strategy, once it offers a way to create integration between the customer and the organization. This paper presents the findings of a case study that investigated how a company implemented a customer interaction system for its products, analyzing which were the internal impacts of this system, which changes were made in its internal process, in which way the IT enhanced the capacity to offer customized products, and how business strategy and IT strategy are aligned.

WF-03 Project/Program Management - 3
Wednesday, 7/21/2010, 17:00 - 18:30
Room: Similan 1
Chair(s) Hans J Thamhain; Bentley University

WF-03.1 [R] The Current Challenges and Status of Risk Management in Enterprise Data Warehouse Projects in South Africa

Itumeleng Legodi; University of Pretoria, South Africa
Marie-Louise Barry; University of Pretoria, South Africa

Enterprise data warehouses can add significant value to organizations through increased strategic advantage levels if executed properly, yet development projects in this area remain very challenging and involve high levels of risk. The global economy is currently in turmoil. In order for organizations to survive the global recession, now more than ever, relevant information is required to make decisions. Technology in the form of business intelligence and enterprise data warehousing can assist organizations in making the tough decisions they need to make. Data warehousing projects make up more than 10 percent of the information technology budgets of most corporate organizations, and these projects have an estimated failure rate of 50 percent. The main purpose of this study was to investigate the current state of risk management in data warehouse projects and to determine where the main risk areas in these projects are. Due to the exploratory nature of this study, a Delphi process was used. The results show that risk management is practiced on data warehousing projects although the process is often not formal. Schedule overruns remain the main problem and on-time delivery is the main criteria for success. In terms of risk management, the financial impact of risks is the most important to consider during risk analysis, lack of stakeholder management is the main cause for risk, scope creep has the biggest impact on risk, and risk management is very important during the feasibility, design and implementation phases.

WF-03.2 [R] Defense vs. Civilian Projects: The Effect of Project Type on Performance

Arik Sadeh; Holon Institute of Technology, Israel
Dov Dvir; Ben Gurion University of the Negev, Israel
Aaron J Shenhar; Rutgers Business School, United States

The search for factors that lead to better project performance and success spans many years of research. The project management literature has dealt extensively with factors affecting projects performance and success (e.g. Might and Fischer, 1985; Slevin & Pinto, 1986). More recent studies (see, for example, Balachandra and Friar, 1997; Shenhar and Dvir, 2007) have shown that the universalistic approach, which assumes that all projects

are similar, may not be optimal for managing projects. Different types of projects should be managed in different ways. The current study analyzes defense projects vs. projects for the civilian market. The main projects attributes were identified using Shenhar & Dvirs (2007) framework for projects classification along four dimensions: novelty, technological uncertainty, complexity and pace. Our basic assumption was that defense projects differ from civilian projects along these four dimensions, and these differences affect performance and success. The results based on 99 defense projects and 91 civilian projects show that defense projects differ from civilian projects by their level of novelty and technological uncertainty, but there are no significant differences in their levels of complexity and pace. The higher levels of novelty and complexity result in lower efficiency of defense projects in terms of meeting schedule and budget goals, but these projects create more opportunities for future business, by opening opportunities in the marketplace (in new market segments and new lines of products) and establishing the technological and knowhow infrastructure for improved products.

WF-03.3 [R] Using Virtual Team Project Communication as a Means of Predicting Virtual Team Effectiveness

Esthee Erasmus; University of Johannesburg, South Africa
Jan-Harm C Pretorius; University of Johannesburg, South Africa
Leon Pretorius; University of Pretoria, South Africa

This paper provides a discussion of virtual teams and possible ways of predicting their effectiveness. The motivation for carrying out this research was to determine if there was a way of quantifying why virtual teams used in a particular company were proving to be very effective. A brief literature review of the topic of virtual teams and virtual team communication, as well as an overview of different communication models, is provided. A case study is presented of a particular company (called DevCo Software Development as a pseudonym for the sake of confidentiality). In the case study the results of two online surveys are presented and discussed. One survey was sent to all the employees within the Labs Department and another sent to only the virtual team members of a specific virtual team within the Labs Department. The case study concludes with an analysis of relevant aspects of the company culture and the effect it appears to have on the way the employees use technology and the effect of this on virtual team success.

WF-04 Technology Management in Aerospace Industry - 1
Wednesday, 7/21/2010, 17:00 - 18:30
Room: Similan 2
Chair(s) Anita Leffel; University of Texas at San Antonio

WF-04.1 [R] Aerospace Industry and SMEs' Approach in the Tokai Area

Nobutaka Odake; Nagoya Institute of Technology, Japan

The aerospace industry shows the highest degree of integration of advanced parts and materials among manufacturing industries. It needs sophisticated and precise processing and advanced assembly technology. High reliability, high precision and super lightweight materials and techniques such as CFRP are requested for parts and materials. A change in the climate in which the aerospace industry operates has resulted in responses to environmental issues such as high energy efficiency, low acoustic noise and managing the burden of price increases of natural resources and the development of new production systems. Thus the structure of the aerospace industry has shifted from demand-sector to private-sector. Japanese major aircraft industries are located in the Tokai region, along with the industries that have developed there to support them. The Tokai is a major industrial agglomeration area in Japan. To further develop the aerospace industry in this region, it is absolutely necessary to encourage competition by welcoming new entities, and to enhance the infrastructure of supporting industries. Extremely high reliability and safety are required in aerospace manufacturing. The objective of this paper is to find a way for SMEs to participate in the aerospace industry based on the challenge of the aerospace industry and regional efforts.

WF-04.2 [R] Lean Supply Chain Management Techniques for Complex Aerospace Systems: Using Discrete Event Simulation to Mitigate Programmatic Cost and Schedule Risk

Cory Hallam; University of Texas at San Antonio , United States

Historically, major US aerospace programs have suffered from cost increases and schedule delays. While inaccurate basis of estimates can lead to discrepancies between planned and actual program performance, a well-planned, lean supply chain can still experience cost and schedule pressures. It is clear that all design changes lead to schedule delays and associated cost increases, and it is also clear that complex system development programs in the aerospace industry inevitably experience design changes. In this research a discrete event simulator was created for modeling aircraft production supply chains where the major variables of interest were the depth of supply chain, the rate of design change impacting the supply chain, and the allocation of design authority to each level of the supply chain. The simulations identified that mitigating schedule delays can be achieved by allocating design authority in the supply chain to speed up change incorporation, and result in first unit lead time being reduced by up to 50 percent, while increasing overall production system productivity. Additionally, staffing design change boards for concurrent change incorporation can also lead to significant productivity improvements. The optimal solution points to a dynamic plan for the change traffic that achieves the most efficient production schedule amongst suppliers. Further, an acquisition program trap is also shown to exist in government acquisition programs that can be avoided by understanding the impacts of the design change traffic identified with this simulation.

WF-04.3 [R] Using Theory of Constraints to Find the Problem about High Level Inventory in the Aerospace Industry

Ying-Chyi Chou; Tunghai University, Taiwan
Ching-Hua Lu; National Chiao Tung University, Taiwan
Pao-Long Chang; Feng Chia University, Taiwan

In the aerospace industry, because each component of the plant is specified and time-critical, many operation management tools are applied to improve material management efficiency. By using theory of constraint (TOC), we construct a Current Reality Tree (CRT) to realize a firms material management objectives and requirement, and what they do to fulfill them. In the second step, through CRT, we diagnose the material management systems Undesirable Effects (UDEs) and find where the systems root problems or conflict material management actions are. We chose an aerospace manufacturer company as a case. The analysis results point out that each department has different goals to fulfill. First, the material management department introduces Economic Order Quantity (EOQ) to reduce average material cost, but the inventory management department uses a flexible purchase system to reduce the inventory cost on the contrary. Second, the operation department purchases universal material to increase the material utility, but increases the average inventory turnover rate, and then decreases inventory management department performance. In the end, we apply Collaborative Planning, Forecasting, and Replenishment (CPFR) to redesign the whole inventory system, and by eliminating the conflict inventory management activities from different departments, we increase the whole system inventory management performance.

WF-05 Innovation Management - 5
Wednesday, 7/21/2010, 17:00 - 18:30
Room: Arcadia Hall 1
Chair(s) Sabine Brunswicker; Fraunhofer Institute for Industrial Engineering

WF-05.1 [R] Crossing Horizons: Applying Analogies to Source Technologies in the Front-End of the Innovation Processes

Sabine Brunswicker; Fraunhofer Institute for Industrial Engineering, Germany
Joachim Warschat; Fraunhofer Institute for Industrial Engineering, Germany
Ulrich Hutschek; Fraunhofer Institute for Industrial Engineering, Germany

External idea sourcing is a central topic in the recent discourse in innovation research. Companies can tap into a range of external sources to search for and source new ideas-

ranging from customer, consumers to suppliers and universities. While it is widely acknowledged that novel ideas often emerge from the combination of distant pieces of knowledge, the current discussion pays only little attention to active search among distant actors using analogical thinking to explore new problem solutions. This action research paper addresses cross-industry innovation sourcing in the front-end and presents a management model for systematic external idea sourcing in distant industry domains. A piloted model is presented that assists technology and innovation managers in developing a cross-industry innovation sourcing strategy and in systematically exploiting cross-industry actors as sources for innovation inputs going beyond technological solutions.

WF-05.2 [A] Role of the Techno-Producer in the Construction Industry, as a Leader of Innovation

Yuji Hirabayashi; JAIST/ Shimizu Corporation, Japan
Yasuo Ikawa; JAIST, Japan

The author has been given the chance to act as the point of contact with various companies for the purpose of inter-industry cooperation. Based on this experience, it became obvious that innovation processes are quite different depending on the type of business. The author's awareness of this fact became clear regarding innovation in the product creation phase in the construction industry. The ability to give technical suggestions to customers as well as to explain associated technology, along with actually developing such technology, is very important. When different types of businesses and technologies are involved in innovation in this way, the techno-producer plays a major role in making such innovations covering various business and industries successful. This paper describes abilities required for techno-producers to effectively act to make innovation happen in the construction industry, by clarifying characteristics and features of the industry. This paper discusses differences in the role of a techno-producer (1) by differences in the production system and (2) in the construction industry and the other industries.

WF-05.3 [R] The Use of a Web-Based Suggestion Scheme to Facilitate Feedback toward Service Innovation: Lessons Learned from Innov@ccor in Accor

Sawitree Sutthijakra; DPU University, Thailand
Adisorn Na Ubon; DPU University, Thailand

Service multinational corporations (Service MNCs) can generate new (or improved) service offerings by capitalizing on knowledge from their subsidiaries (located across the world). Knowledge from those actors are integrated and exploited through a feedback mechanism that enables collective and corrective learning. The feedback mechanism allows subsidiaries to suggest, share and articulate their experiences and knowledge, with an aim at successive improvement. However, Service MNCs have encountered difficulties to integrate and articulate knowledge and information from several subsidiaries because of different characteristics, preferences and localities of those subsidiaries. Our study, therefore, aims to propose a framework for understanding the use of a virtual feedback system (a web-based suggestion scheme) embedded in learning that facilitates service innovation, and its implementation in Service MNCs. This qualitative research employed a case study approach. The case of Innov@ccor as a web-based suggestion scheme in Accor (the multinational hotel group) was examined. Top management at headquarters (HQs), regional HQs, and affiliated hotels in different countries were interviewed. The annual reports of Accor were analyzed. The research was conducted during December 2005-April 2007 in three countries (i.e. UK, France and Thailand). We found that the virtual feedback system can generate service innovation. It enlarges a scope of corrective actions and collective learning among employees worldwide. An implementation of the virtual feedback system requires a conformance of standard operating procedures, an employee involvement, and local adaptation.

WF-06 Technology Management in Energy Industry - 1
Wednesday, 7/21/2010, 17:00 - 18:30
Room: Arcadia Hall 2
Chair(s) Andrea Masini; London Business School

WF-06.1 [R] The Trajectory of Technological Development and Interdependence in China's Biofuel Industry

Mei-Chih Hu; National Tsinghua University, Taiwan
Fred Y Phillips; Alliant International University, United States

Successful innovation depends upon complementary innovations and stimulation of investment in related fields; accumulated capacity in various related technologies comprises critical innovation infrastructure for an emerging industry, as well as for a nation that intends to reinforce its overall innovative capacity. As a technology latecomer aiming at reducing its energy dependence on fossil fuel as well as its carbon emissions, China is the third largest bioethanol producer in the world and number one in Asia. The success of biofuel manufacturing is restricted by limits on availability of primary raw materials, by the maturity of fermentation and biorefinery technologies, and by new knowledge about the limitations of food crop-based biofuels and the overall energy budget of biofuels. This paper examines Chinas emerging biofuel industry, exploring two questions: How have biofuel-related technologies evolved and interacted with other fields? Does technological interdependence in the biofuel industry reciprocally reinforce China's innovation capability in related fields?

WF-06.2 [R] Study of Smart Grid for Thailand and Identification of the Required Research and Development

Araree Jirapornanan; NECTC, Thailand

Global warming necessitates a variety of responses including efficient energy use to reduce carbon emissions. The associated cost reduction should affect economic growth in general. For electricity, smart grid is an upcoming technology being applied currently in developed countries. Australia, Canada, China and the United States are planning to finish the smart grid in 2010-2012, while the European Union has been applying it since 2005. We believe Thailand should start considering this technology immediately. This paper deploys the technology roadmapping approach to identify the research and development needed to support the smart grid in Thailand. We will define the smart grid and discuss its current status in Thailand. Its establishment will require the employment of a collection of technologies, including information, operational, communication, energy and consumer technologies. Ongoing projects and ready-to-use technologies will be reviewed, the policies and plans related to electricity delivery infrastructure will be analyzed, and Thailand's readiness for smart grid will be assessed. The main focus will be on identifying the existing problems that need further research and development. By analyzing capabilities of Thailand's research and by surveying the market, some predictions for the next essential developments can be made. This paper will be useful for research organizations.

WF-06.3 [R] Ecosystem Strategies for Complex Technological Innovation: The Case of Smart Grid Development

Ari Ginsberg; NYU, United States
Mel Horwitch; Polytechnic Institute of NYU, United States
Subhendu Mahapatra; Polytechnic Institute of NYU, United States
Chhavi Singh; Polytechnic Institute of NYU, United States

This paper deals generally with the creation, structuring and behavior of innovation ecosystems, i.e. a network of diverse actors, including emerging young firms, as well as established medium-size and large enterprises, NGOs, and government. More specifically, the paper explores these basic issues using the example of smart grid development, which is now taking place in the cleantech/renewable energy field. To examine and compare smart grid innovation ecosystems being assembled by GE, IBM and Cisco Systems, our study assembles data on ecosystem membership, provides metrics on key parameters, and generates maps of these smart grid innovation ecosystems. These ecosystems are also analyzed and compared using social networking analysis, focusing in particular on the parameters of diversity, centrality (degree, betweenness and closeness) and density. Generally, our results show that innovation ecosystem strategies constitute a key approach for entering and innovating in the smart grid arena.

WF-06.4 [A] China National Innovation System in Energy Sector: The Case

Study on CCS

Dapeng Liang; Harbin Institute of Technology, China
Jun Kang; Harbin Institute of Technology, China
Hengwei Liu; Tufts University, United States
Weiwei Wu; Harbin Institute of Technology, China
Xinpeng Xing; Harbin Institute of Technology, China
Zhigang Wang; Harbin Institute of Technology, China

This paper makes a case study on Chinas national innovation system of CCS under the framework of technology system theory. The analysis focuses on two aspects of CCS technology system: the first one is the actors of CCS technology and the function of each actor in the sub-system of searching, choosing and implementing; the second one is the learning process and knowledge creation. The innovation of CCS in China is supported by the investment in R&D from the government, which is used for development and application of CCS technology. There is an entire support system for energy technology research, and among them, the most important systems are the planning for primary laboratories and research-based platform construction. It is these labs which become the base units for energy technology innovation and new knowledge creation. China's universities and research institutions have close cooperation with industry to resolve technology problems in the production process, so the research objectives are expected to be very clear. The cooperation between research institutions are mainly joint applications for research on particular issues and undertake demonstration projects, the results obtained can be shared in the research institutions, thus accelerating the spread of knowledge dissemination. Cooperation between enterprises focuses on the solution of common technical issues, and such cooperation is more to accelerate the promotion of new technology. Despite the fact that the national innovation system has a strong driving force and clear research objectives, the shortage of basic research is an obstacle for sustainable innovation, so many Chinese universities cooperate internationally to access and receive external knowledge, and thus compensate for their lack of basic research flaws. The more prominent are the organizations, the more likely is cooperation with foreign countries. These institutions become an important source of the introduction of external knowledge.

HA-01 PLENARY - 5

DATE: THURSDAY, 7/22/2010
TIME: 08:00 - 9:30
ROOM: BALLROOM A
CHAIR: PROF. DR. NUKET YETIS, TUBITAK, TURKEY

HA-01.1 Resilience of Company Management System

Naim H Afgan ; Instituto Superior Tecnico, Portugal

The evaluation of a company management system as a complex system is a critical goal of the modern approach to the validation of a complex system. In this context, the introduction of the Resilience Index as the aggregate indicator for the measurement of the quality of the management system is an important evaluation goal for complex systems. The resilience management process is aimed at building an awareness of the resilience issues, selecting the essential organizational components, and identifying and prioritizing the key vulnerabilities. In the organization resilience assessment procedure, it is of primary interest to verify the vulnerability of the company management system and its structure. Among the main attributes of the resilience procedure is the implementation of the following measures: Situation awareness is a measure of an organizations understanding and perception of its entire operating environment. Management of keystone vulnerabilities defines those aspects of an organization, operational and managerial, that have the potential to have significant negative impacts in a crisis situation. Adaptive capacity is a measure of the culture and dynamics of an organization that allow it to make decisions in a timely and appropriate manner both in day-to-day business and also in crises. The Resilience Index of a company is determined by the sudden changes in four indicators: company profit indicator, company income indicator, product cost indicator and manpower indicator. It is defined as an additive function of the changes in the individual indicators. Four cases are presented to illustrate the Resilience Index concept in this paper.

HA-01.2 The Next Step in Skilled Labor Development for HDD Industry in Thailand

Dave Rauch; Western Digital Corporation, United States

As of 2007, Thailand has become the leading producer of HDDs in the world. It has been attractive for foreign direct investment due to its incentives, tax policy, labor availability and cost, and its industrial policy. In addition to remaining competitive with its neighbors in these areas, Thailand must develop a larger technical talent base to support the growth in HDD storage capacity and volume. Thailand has recognized the need for skilled labor to support the industry and has established programs to address several areas of HDD manufacturing in conjunction with industry. As HDD technology progresses, and HDD companies look to reduce development costs by transitioning more development to their manufacturing sites, new programs need to be put in place for Thailand to support these emerging trends. These programs should be focused on the unique requirements of component development in the areas of process technology vs. current emphasis on assembly technology. A proposal for academic curriculum and policy will be presented.

HB-01 Emerging Technologies - 2
Thursday, 7/22/2010, 10:00 - 11:30
Room: Ballroom A
Chair(s) Mel Horwitch; Polytechnic University

HB-01.1 [A] Dynamic Inventory Management Parameter Configuration Concept

Ari Happonen; Lappeenranta University of Technology, Finland
Erno Salmela; Lappeenranta University of Technology, Finland

This study examined knowledge enhancement model, in which a logistics service provider (LSP) could provide dynamic warehouse parameter management and update service for their customers in the future. The paper is targeted to reveal case data and future directions about logistics service of dynamic inventory management. This type of a case based research data about 4PL model cases was one of the research gaps revealed by the literature review done by Selviaridis and Spring (2007). Dynamic inventory management service itself is one of those new service models logistics service providers can offer in the future. The aim of the study is to research the dynamic inventory management model and tactical role of the LSP in 4PL service concept. The research data has been collected through interviews of company owners, logistics managers, project leaders and logistics consultants and also from a inventory data based case study. The literature review focused on scientific journals of logistics area. The study revealed new business arrangements, operational concepts and financial aspects that a LSP could offer for their customers on future, through dynamically inventory parameter management model. This new concept will allow providing of strategic services, such as temporary funding of components on stock (based on demand analysis and projection and also based on forecast on base material future trends), continuous development of the supply chain and complete new exception management capabilities. The model allows detailed analysis of inventory items consumption patterns (uncertainty on demand on both, time and quantity dimensions).

HB-01.2 [R] Option Value Embedded on the Brazilian Flex Fuel Vehicles

Alceu S Camargo Jr.; Universidade de São Paulo, Brazil
Abraham Sin Oih Yu; University of Sao Paulo, Brazil
Paulo T Nascimento; University of São Paulo, Brazil
José V Bellinetti; CNEN, Brazil
José J Marques; Braskem, Brazil

Leandro J Morilhas; University of São Paulo, Brazil

The Brazilian auto industry has changed significantly since 2003 by the introduction of the flexible fuel vehicles that can run with any mix of gasoline or sugarcane ethanol. Sugarcane ethanol is a well known renewable fuel and an efficient alternative to fossil fuel due to its high energy yield and also its great potential for fixing carbon dioxide. Consumers see great opportunity in acquiring a flex fuel vehicle because the car owners have the option of selecting the fuel based on their relative prices. What are the benefits for Brazilian consumers of owning a flex fuel vehicle in comparison with gasoline engine cars? This study applies the real options methodology to capture the worth of owning and operating a Brazilian flex fuel vehicle as regards the relative prices of the two fuels. The more uncertain the relative prices of fuels the more valuable will be the option value embedded in Brazilian flex fuel vehicles. Sensitivity analyses regarding different scenarios on Brazilian fuel markets are developed and their impacts are discussed.

HB-02 Information Management - 1
Thursday, 7/22/2010, 10:00 - 11:30
Room: Ballroom B
Chair(s) Juthatip Wisanmongkol; NECTEC

HB-02.1 [R] The Impact of Appropriation Consensus and Cooperative Team Norms on the Adoption of Collaborative Information Systems: An Empirical Study in Taiwan

Wenjywan Su; Far East University, Taiwan
Hsiu-Ying Lin; Far East University, Taiwan

Teamwork has become increasingly important in modern businesses, and collaborative information systems (CIS) that support teamwork have become critical tools. Our study investigated the factors involved in team members decision-making in a team context. We used the technology acceptance model (TAM) as a basis and incorporated the team-level factors of consensus on appropriation (COA) and cooperative team norms (CTN) into the model. Questionnaires were sent to project team members working in mid-sized to large businesses in Taiwan, and 134 valid surveys were collected and analyzed with partial least squares. Our results showed that CTNs have no effect on personal intention to use CIS but that they do affect perceived usefulness of CIS. COA has a direct effect on perceived usefulness as well. Perceived usefulness worked as a mediator between COA/CTN and perceived performance of the system. Perceived performance was strongly affected by perceived usefulness. The paper contributes toward a better understanding of information technology adoption with regard to team-level factors. Implications for future research and management practice are discussed.

HB-02.2 [R] Describing a Service Oriented Reference Architecture Using an Electronic Process Guide: Case of Distributed Disasters Knowledge Management

Jari Leppaniemi; Tampere University of Technology, Finland
Timo Mäkinen; Tampere University of Technology, Finland

In this paper we show the initial steps towards how to apply an electronic process guide (EPG) for describing information and its utilization process, of domain specific service oriented reference architecture (DS-SORA), for disasters and emergency management. Reference architecture (RA) models and uses abstract elements in a domain. It is possible to have several RAs at different levels of the same domain. Typically, RA is described as a static construct showing concepts and their relationships. RAs usually do not include any guidance on how to implement these abstract concepts or how to realize generalized functions in concrete implementations. The application of EPG links the activities of service design processes to the corresponding RA information. Although the demand for interoperation between systems and organizations is growing, the choice between available technologies is not straightforward. The follow-up of the development of these technologies is also a hard task. Without a dynamic mechanism for following the development of the main ingredients of the selected reference architecture, there is a danger that its description and benefits will degrade quickly and endanger the maintenance, further development, and governance of the implemented concrete architecture. EPG offers a dynamic approach for the presentations of RAs and their realization processes.

HB-02.3 [R] Service Innovation on Electronic Business: The Case Study of Taiwan

Chen-Chun Lin; National Chiao Tung University, Taiwan
Jou-Chen Chen; National Chiao Tung University, Taiwan
Joseph Z Shyu; National Chiao Tung University, Taiwan

This paper presents the evolution of service innovation on e-business (electronic commerce) industry and forecasts the future market demand in Taiwan. The emerging business model of service innovation creates many value-adding economical activities for the e-business sector, including retail, finance, transportation, and entertainment. The e-business industry is becoming more dynamic and diversified. With multiple-analysis, this study used not only Bass model to forecast the life cycle of the e-business industry, but network analysis, content analysis and interviews to deepen the understanding of the process of service innovation within the broad electronic services scope. This study suggests that the e-business industry in Taiwan has turned mass service into infrastructure, platform and software service and built another industrial life cycle. The findings of this study also have implications for the new business model based on new service innovation and innovative service diffusion. A limitation is the well-known fact that sudden services breakthroughs often have not been foreseen by the majority of main-stream e-business services.

HB-02.4 [R] A Case Study of RFID Data Management in Steel Transform Company

Taweesak Sanpechuda; NECTEC, Thailand
Juthatip Wisanmongkol; NECTEC, Thailand
La-or Kovavisaruch; NECTEC, Thailand
Sodsai Wisadsud; NECTEC, Thailand
Thitipong Wongsatho; NECTEC, Thailand
Anuwat Chaiwongyen; NECTEC, Thailand
T. Charoenporn; NECTEC, Thailand

Over the recent years, many industries have started to implement Radio Frequency Identification (RFID) as their new track-and-trace tool to enhance the management processes. These can also be seen from the increased number of RFID implementations in the steel industry around the world. Meanwhile, a pilot project on RFID deployment in one steel transform company in Thailand has also been conducted by the National Electronics and Computer Technology Center (NECTEC). The integration of RFID into the existing management system based on barcode technology has raised several challenges concerning the data management of the RFID system. One is the data consistency between the barcode system and the RFID system. Others are caused by the characteristics of RFID data such as data redundancy and data inaccuracy. In this paper, we present the integration of RFID technology into the steel traceability and the middleware design for data filtering and data management for the entire steel production line.

HB-03 Collaborations for Technology Management - 2
Thursday, 7/22/2010, 10:00 - 11:30
Room: Similan 1
Chair(s) Hacer Ansal; Isık University

HB-03.1 [R] Developing Collaborative Relationship between Industrial Service Providers and Their Client: The Case of Industrial Maintenance Management

Ville Ojanen; Lappeenranta University of Technlogy, Finland
Joonas Kolehmainen; Lappeenranta University of Technology, Finland
Toni Ahonen; VTT Technical Research Centre of Finland, Finland
Markku Tuominen; Lappeenranta University of Technology, Finland

Recent years have increased the number of studies focusing on development and co-production of industrial services together with partners. The complexity of managing industrial

services (e.g. maintenance) also causes crucial managerial needs, e.g. how to find the focal areas that should be paid attention to in order to find solutions for developing the collaboration between service provider and client. This study aims to provide a comprehensive and objective viewpoint to the development of collaborative relationships in industrial environments. The paper especially focuses on studying the antecedents affecting the development of collaboration and realization of the common value in the case of maintenance of industrial asset fleet. The current study is a part of larger applied research project focusing on the industrial service business development. Individual and group interviews in three case organizations as well as client interviews have been utilized in order to form a reliable view on the relationship development in maintenance management. The results of the study bring forth the following development areas and also specific managerial recommendations related to these four main areas, which are; 1) strengthening the customer perspective, 2) collaborative capability development, 3) organizing and decision support, and 4) monitoring of relationship development.

HB-03.2 [R] Benefitting Innovative Capabilities of Software Developer/User Communities in Developing Countries

Hacer Ansal; Isık University, Turkey
Nihan Yildirim; Istanbul Technical University, Turkey

Since technological innovation is generally considered to be a major force in global economic growth, the development of innovative capabilities in developing countries has been a very important policy issue. Free/Libre Open Source Software (FLOSS) has reshaped software technology through the creation of developer/user communities which enabled the collaboration of different parties resulting in the production of Linux and similar software projects. FLOSS user/developer community networks serve not only as learning, reviewing, and testing environments for developers, but they may also act as innovation networks that contribute to the improvement of the innovative capabilities of individual developers within the community. Therefore, understanding the characteristics, the motivating factors and the innovative dynamics of these developer communities will provide valuable insight into how to improve the innovative capabilities of developing countries in relation to software. The aim of this paper is to explore the characteristics of FLOSS developer communities in order to discover what benefits they may offer developing countries in generating innovative capabilities related to software. By conducting a survey in the FLOSS user/developer community in Turkey, the demographic characteristics, motivation factors and innovative characteristics of the community are explored, and the question of whether these communities may act as innovation networks is examined. It is concluded that FLOSS community networks mostly serve as knowledge sharing and collaboration platforms; however, they do have the potential to evolve into innovation networks if they receive support from the local software industry and academic institutions.

HB-03.3 [R] Chaos in the Evolution of Relationships within Strategic Networks Based on Bionics

Yuying Wu; Beijing University of Technology, China
Pengcheng Mang; Beijing University of Technology, China
Feng Yan; Beijing University of Technology, China

Chaos theory is applied to analyze the co-competitive relationships among three corporations based on corporation bionics. After analyzing the stability, the bifurcation is displayed by numerical simulation. The result shows that although it is beneficial for improving the performance of the members in the strategic network to increase the corporations developing speed and the positive effects of cooperation among corporations, there may be chaos in strategic networks. Once chaos happens, the system will lose control. Furthermore, the numerical simulation of chaos control shows that chaos can be controlled by choosing suitable parameters and establishing an effective controlling mechanism in strategic networks.

HB-04 Patent Analysis - 5
Thursday, 7/22/2010, 10:00 - 11:30
Room: Similan 2
Chair(s) Frederick Betz; Portland State University

HB-04.1 [R] A Comparison of Individual and Team Research Performance: A Study of Patents in III

Lien-An Hsu; National Chengchi University, Taiwan
Kun-Hong Lee; Institute for Information Industry, Taiwan
Chien Chiang Lin; Shih Hsin University, Taiwan

Individual and team efforts are the two widely accepted forms of conducting R&D activities in organizations. Based on an analysis of 10 years of patent records from the Institute for Information Industry (III, a prestigious national research institute in Taiwan), the authors found that individual and team efforts are both productive approaches to organizing the research. However, in what circumstances will a researcher or a research team outperform its counterpart? This study purports to answer this question. The authors conducted nine face-to-face interviews with patent owners; among them, three were both individual and team patent owners. The analysis revealed that individual researchers are more efficient than research teams in applying patents; however, research teams are superior to individual researchers in terms of passing rate and quality of patents granted. The coverage of a patent is the most important determinant of the organizing approach, while the characteristic of the project management system of III is the second important determinant. Team size, team composition, and voluntary members are also key determinants of research team effectiveness. The most effective teams consist of 2-4 members, including at least one experienced member. And there are many patent owners who prefer the team approach only. Whether conducted by an individual or a team, the initial idea of a R&D project was generally derived from routine meetings or through casual colleague exchanges and proposed by one or two individuals. Being a possible patent, the initial idea has to be worked out through several phases and to obtain outside help.

HB-04.2 [R] Patent Price Dynamics in the Context of Patent Age and Patent Latent Variables

S Shyam; Indian Institute of Science, India
Mary Mathew; Indian Institute of Science, India
Dipanjan Nag; ICAP Ocean Tomo LLC, United States

The decision to patent a technology is a difficult one to make for the top management of any organization. The expected value that the patent might deliver in the market is an important factor that impacts this judgment. Earlier researchers have suggested that patent prices are better indicators of the value of a patent and that auction prices are the best way of determining value. However, the lack of public data on pricing has prevented research on understanding the dynamics of patent pricing. Our paper uses singleton patent auction price data of Ocean Tomo LLC to study the prices of patents. We describe price characteristics of these patents. The price of these patents was correlated with their age, and a significant correlation was found. A price - age matrix was developed and we describe the price characteristics of patents using four quadrants of the matrix, namely young and old patents with low and high prices. We also found that patents owned by small firms get transacted more often, and inventor owned patents attracted a better price than assignee owned patents.

HB-05 Innovation Management - 6
Thursday, 7/22/2010, 10:00 - 11:30
Room: Arcadia Hall 1
Chair(s) Charles M Weber; Portland State University

HB-05.1 [A] Corporate Management Analysis and Evaluation of Unique Enterprise Group

Yasuyuki Suzuki; Japan Techno-Economics Society/Ritsumeikan Univ., Japan

Four kinds of firm resources, financial capital, physical capital, human capital and organizational capital, are emphasized as the source of enterprise competitive advantages in business; however, human capital is not particularly considered as an important resource. However, the importance of human capital has been attracting attention recently. Unfortunately, this concept of human capital is not still clear due to un-established evaluation methods and low recognition and awareness by chief executives. On the other hand, most

companies from start-ups to large companies have tried to be innovative and create new businesses; however, unique companies, those who play an active role in the international market due to their cutting edge technologies, clearly stand out from other companies. According to a questionnaire survey of CEOs of unique companies, these CEOs enthusiastically concentrate on managing three kinds of viewpoints, new technology/business development, marketing activities, personnel/organizational management, and especially they make great account of managing human capital. The objectives of this report are to clarify management philosophy and behaviors of CEOs of unique companies and make clear the importance of human capital in business.

HB-05.2 [A] The Effect of Human Resources in Science & Technology and R&D on the Performance of National Innovation System in China

Yangxue Xiang; Zhejiang University, China
Jin Chen; Zhejiang University, China
Hongzhi Liu; Research Ctr. for Science, Technology & Policy, China

This paper discusses the effect of human resources in science and technology and R&D activities on the performance of the national innovation system in China. Firstly, the authors configured an evaluation index system of national innovation performance based on the international index system of innovation capacity such as the European innovation scoreboard with the method of experts scoring. This research is focused on the national innovation performance over eight years, from 2000 to 2007, in China and to discover the effect of human resources in science and technology and R&D on the performance of national innovation system by using the statistical tools of AHP and regression analysis. Finally, under the context of the national innovation system, Chinas innovation capacity is analyzed and recommendations are offered based on the findings in terms of HRST capacity-building and R&D funding support.

HB-05.3 [R] The Correlation Analysis between the Number of College Students and National Innovation Capacity in China: Based on Johansen Co-integration Test and Granger Causality Test

Tao Feng; Shanghai University of Political Science and Law, China
Song Chen; Tongji University, China

The human capital level is an important factor that affects national innovation capacity. The formation and accumulation of human capital are mainly from higher education. Selecting the number of patents to represent national innovation capacity, and the number of college students to represent human capital, using Johansen co-integration test and Granger causality test, we have a correlation analysis between the number of college students and patents in China. The result shows there exists a long-term equilibrium between the number of college students and patents in China. The number of college student is the Granger cause of patents.

HB-06 Technology Management in Automotive Industry - 1
Thursday, 7/22/2010, 10:00 - 11:30
Room: Arcadia Hall 2
Chair(s) Chayakrit Charoensiriwath; NECTEC

HB-06.1 [R] Investigating the Relationship between Export Performance and Innovation Outputs amongst South African Automotive Component Suppliers

David Phaho; University of Pretoria, South Africa
Vusi V Skosana; Tshumisano Trust, South Africa

The relationship between innovation outputs and export performance of small- and medium-sized enterprises (SMEs) is of considerable interest for academics and policy makers considering the stated importance of these firms to economic growth and job creation. In this study, the relationship between innovation outputs (e.g. new or improved products, processes or services) of South African automotive component suppliers (most of them SMEs) and export performance is investigated using statistical analysis. The results indicated no positive correlation between the innovation outputs and export performance among the surveyed firms. On the other hand, component suppliers which held unique market positions (e.g. as sole producers of product(s)) in the country were more likely to export those particular products than any other products. This suggests that innovation amongst the surveyed SMEs is guided by the needs or specified requirements of local automotive assemblers or original equipment manufacturers (OEMs) and less by the desire to be globally competitive through exports to key foreign markets. The OEMs in turn could be sourcing from local suppliers to take advantage of government funded incentives to enhance local product content in the assembly of vehicles. The implication is that for South African component suppliers to survive and thrive in the absence of these incentives as well as emerging global component sourcing strategies amongst OEMs, they not only have to develop innovative and competitive products but also embark on exporting them to lucrative global markets.

HB-06.2 [R] The Importance of Innovation for Firm Performance in the Automotive Component Manufacturing Industry in South Africa

Barend G Van Vollenhoven; University of Pretoria, South Africa
Andre J Buys; University of Pretoria, South Africa

The automotive innovation system is a complex network that includes various role-players. Relatively few of the OEMs design, manufacture, integrate and market vehicles in the automotive value chain. The first tier of suppliers is made up of large, technologically sophisticated suppliers which develop, integrate and deliver complete systems. However, they rely heavily on layers of suppliers for the supply of various components and parts. Between these first tier suppliers and the OEM, the path for innovation is set though the system as a whole benefit from more efficient processes, higher quality and cost reductions. This research questions the importance of innovation in the automotive component manufacturing industry in South Africa, and its objective is to find indicators of innovative activities in the industry and to link those to firm performance. The research found that South African firms in this industry are much more involved in innovation activities than most other manufacturers and that their innovation activities are focused on areas that can make a significant contribution to firm performance. Most firms are involved in innovation activities, irrespective of whether they are local or foreign owned or whether they have an official R&D department or not. Since this industry contributes significantly to the South African gross domestic product, it is important to add the finding from this research to the body of knowledge that will guide policymakers in government and in the private sector with respect to the importance of innovation and to create incentives to ensure that firms continue to innovate.

HB-06.3 [R] Contribution of Support Schemes to Innovativeness in the South African Automotive Component Industry

Roel M Stijger; University of Pretoria, South Africa
Jasper L Steyn; University of Pretoria, South Africa

The contribution of government support schemes to foster innovativeness in the automotive component manufacturing industry was investigated in the developing country context. South Africas national, provincial and local governments have various support schemes to benefit the domestic automotive industry. This industry has experienced a significant growth in foreign direct investment (FDI) since 1995, mainly due to the introduction of the Motor Industry Development Programme (MIDP). By using the data from the South African part of the International Automotive Supplier Research, the contribution of the MIDP and the subsidies of the Sector Education and Training Authorities (SETA) to the innovativeness of the automotive component manufacturers was evaluated. The research indicates that there was a correlation between the MIDP and innovation in logistics and in organizing external relationships, but no correlation between innovation and the subsidies by the SETA.

HB-06.4 [A] The Strategic Adoption of Information Standard to Increase Competitiveness in the Automotive Industry in Thailand

Chayakrit Charoensiriwath; NECTEC, Thailand
Waraporn Sangkiettiyut; Thailand Automotive Institute, Thailand

The automotive industry has one of the most complex supply chain operations. To efficiently manage an automotive supply chain, information technology (IT) is the most crucial part in supporting the whole operation. Over the last few decades, electronics data interchange

(EDI) has been used in the automotive industry to exchange information between business partners. However, the technology is used mainly by multinational companies, while small- and medium-sized enterprises (SMEs) have not been able to enjoy the benefits of EDI. One of the main reasons for this is the cost and the complexity of the EDI system. Since 1998, ebXML, an XML-based standard for information exchange between trading partners in the e-business environment, was created with support from the United Nations. Over the past decade, the adoption of ebXML by industries has grown steadily. Several governments in Asia have formal programs to support the adoption of the ebXML standard by local SMEs. It is perceived that the ebXML standard can help local SMEs integrate seamlessly with the global supply chain. This study examines the case of ebXML adoption by companies in the automotive industry in Thailand. The automotive industry is the second largest contributor to Thailand's GDP with hundreds of local companies taking different parts of the industry's supply chain. The government strategically supports the adoption of information standards such as ebXML by the local SMEs with an aim to improve the way local SMEs in the automotive industry manage the supply chain and thus increase their competitiveness overall.

HD-01 Strategic Management of Technology - 2

Thursday, 7/22/2010, 13:00 - 14:30
Room: Ballroom A
Chair(s) Mikko Pynnönen; Lappeenranta University of Technology

HD-01.1 [R] Option-Games Approach to the Strategic Partnership of Biotech Start-ups

Takao Fujiwara; Toyohashi University of Technology, Japan

For most biotech start-ups financing, the fundraising from the venture capital and capital market is not enough. Strategic partnership with the big pharmaceutical or biotech companies is also necessary. For the uncertain projects in the biopharmaceuticals, the flexibility of decision making is valuable against irreversibility. On the other hand, the strategic flexibility tends to become the trade-off relationship with the commitment against the preemptive behavior by rival companies. Therefore, what kinds of conditions are necessary for matching between the decision under uncertainty on flexibility value and the Nash equilibrium on commitment value, for the partnership formation? Under such research question, this study applies the option-games by integrating between the real options for evaluating the flexibility value and the game theory for estimating the commitment value. Then, a research objective is to develop and test the managerial logic and tools for the optimization between the long-term technological project value and the competitive position, in order to facilitate the strategic partnership as a technological and financial survival method for the biotech start-ups, whose majority always is in deficit conditions. As a conclusion, this study found some information about parameter setting forward open innovation by simulation based on option-games models.

HD-01.2 [R] New Growth of Forest Cluster: From Paper Based Products to Customer Value-Added ICT Services

Mika Immonen; Lappeenranta University of Technology, Finland
Mikko Pynnönen; Lappeenranta University of Technology, Finland
Olli Kytölä; Lappeenranta University of Technology, Finland

Forest cluster may have finally reached the point where the road of making bigger profits by managing costs and efficiency has come to an end. The market does not grow as it did a decade ago, the global competition is hardening and investments that are made to machines in order to respond to the potential growth have created a situation of overcapacity in industry. The value potential, however, comes from convergence areas with other industries and the new customers of the forest industry are the old and well known customers of the converging industries. When seeking growth from this direction, the rules of business are not the same anymore. This paper presents results of a research concerning new health care services created with capabilities of the forest cluster. The need for the support of living at home is global, but especially a European mega trend, which is driven by ageing of citizens and cost saving. The paper provides a customer need assessment and business model analysis of intelligent medical package in an assisted living environment.

HD-01.3 [R] Technological Competence and Capacity Building within Firms: South Africa's Civil Aircraft Industry

Daphney H Mayindi; University of Pretoria, South Africa
Michael O Kachienga; University of Pretoria, South Africa

The objective of the paper is to provide an analytical perspective on the importance of South African (SA) civil aircraft firms building technological capabilities so as to develop technological competence and competitiveness in the global markets. The paper emphasizes the role of government and the national technological assets in shaping national technological capabilities and competencies through various support mechanisms that could facilitate firm-level productivity and sustainable growth. It also indicates the importance of technological knowledge, learning and absorptive capacity in contributing towards shaping the nation's capability building within firms. Factors found to have impacted on the technology capability building process of the SA civil aircraft industry are discussed. The paper proposes interventions needed for the successful building of technological capabilities and national technological competencies that could lead to growth and globalization.

HD-01.4 [R] GPS, GALILEO, and Nanotechnology: A Cost-Effective Satellite Technology?

Oludare Olorunniwo; Obafemi Awolowo University, Nigeria
Moses A Olorunniwo; Obafemi Awolowo University, Nigeria

The prospects of cost-effective Earth observation missions, using the global positioning system (GPS) and Galileo satellites (GIOVE-A and GIOVE-B) and associated telemetry designs, are migrating toward economical satellites, operational ground stations, efficient data distribution structure, and qualitative space system management. The concept of application specific integrated micro-instruments (ASIM) microelectronics, integration of micro-electro-mechanical systems (MEMS), miniaturization, and signal conditioning enables the development of small satellite technologies. However, cost-effective management of nano- and pico-satellites, rapid data distribution methods, and quality assurance procedures of these mission developments, are far from achievable standard and performance capacity. Thus, this study presents the status quo, possibilities and prospects of small satellite mission activities, research budget and cost drivers toward attaining cost-effective missions, with visions of the future missions and greater involvement of local and small-scale industry.

HD-02 Information Management - 2

Thursday, 7/22/2010, 13:00 - 14:30
Room: Ballroom B
Chair(s) Jeffrey S. Busch, PMP; Portland State University

HD-02.1 [R] Combined IQA Approach with a Case Study for Information System Requirements

Chwen-Yea Lin; Tatung Institute of Commerce and Technology, Taiwan
Chien-Chung Tu; Transworld Institute of Technology, Taiwan

Information system (IS) utilization has permeated every business activity and IS usage is an important barometer of success. Effective IS usage is tied directly to an organization's performance, goal, and competitive advantage. The gap between potential IS and its actual use has increased our awareness of user needs. A variety of models incorporate attitude and use intention to explain IS usage, of which the technology acceptance model (TAM) is well known to explain software utilization. However, system users are more or less in mandatory circumstance, intention to use an IS will likely be meaningless. Furthermore, ease of use of IS needs to be adapted to suit the constantly changing environments. Users mindmap or mental models reflect their expectations and understanding of IS and the way they interact with systems. In this paper, we use the Interactive Qualitative Analysis (IQA) approach to represent the users theory in perception to make truth claims of IS and interpret the cause/effect relationships. Our findings suggest that system specialists need to pay more attention to user habit and their interaction with installed systems for continuous usage.

HD-02.2 [R] Dynamically Mapping Screen Real Estate Optimality

Luigi Benedicenti; University of Regina, Canada
Sheila J Petty; University of Regina, Canada

This research paper brings together the fields of systems engineering and media studies to investigate the cinema/television/computer/mobile device screen as a dynamic interface through which points of engagement or how the aesthetics and narrative structures presented on the screen engage the user and create meaning. The co-authors work towards the development of a screen real estate grammar or ontology by considering the following set of questions: 1. How can the specific structures (ie/ uses of time, space, text, screen resolution, window size, etc.) of user interfaces (ie/ iTunes and QuickTime X Windows) be mapped? 2. Will such mapping expose levels of convergence (ie/ where old forms meet/influence/contribute to new developments and new content? 3. Is it possible to work towards a language of conventions similar to that of other disciplines (i.e. film language)? 4. Can interface elements be prioritized on a contextual basis? The framework is presented in the context of a decision support system for user interface optimization, which allows interfaces to be dynamically adapted to different formats given a set of rules that create a semantic mapping between interface elements. Generative programming is then used to create the optimized interface.

HD-02.3 [R] The Moderating Effect of IT Capability on the Service Innovation and Supply Chain Performance

Wei-Chen Tsai; Aletheia University, Taiwan

The purpose of this research is to examine the impact of application degrees of service innovation on supply chain performance while using different information technology capabilities. The model was empirically tested using a path analysis method of structural equation modeling to examine the hypothesized relationships. The results addressed that service innovation tends to be associated with the increased supply chain performance for traditional companies. This research showed that managerial full support and involvement, cautious selection of the service innovation process and information integration make the IT applications, service innovation process and readiness to collaborate closely, creating business value and promoting operational performance in the supply chain. Finally, the result also found a strong moderator effect of information technology capability on the relationship between the application degree of service innovation and supply chain performance as the corporate operational, supplier and buyer performances.

HD-03 Science and Technology Policy - 2
Thursday, 7/22/2010, 13:00 - 14:30
Room: Similan 1
Chair(s) Deok S Yim; Gyeonggi Research Institute

HD-03.1 [R] Large-Scale ICT Innovation and Policy

Dong-Hee Shin; Sungkyunkwan University, Korea, South
Tae-Yang Kim; Sungkyunkwan University, Korea, South

Drawing upon actor-network theory (ANT), this study presents a case analysis for a socio-technical framework to assess Koreas strategy for the development of the ubiquitous city (u-city). The u-city initiative, a national development project, focuses on strengthening the role of information and communication technologies (ICT) in urban planning and management. Analyzing empirical materials from u-city development, this study traces and unpacks the interaction occurring around the u-city innovation and also identifies patterns of innovation, concentrating on negotiation and translation implementation. ANT provides a framework of ideas for describing the process of innovation and developing stories that explain technology take-up. Results provide insight into the Korean IT environment by offering a socio-technical analysis of u-city development and how it involves the dynamics of industry, regulation, and technology.

HD-03.2 [R] Developing National Emerging Technology Strategy

Pisek Gerdsri; Siam Cement Group (SCG), Thailand
Dundar Kocaoglu; Portland State University, United States

As the pace of global competition increases, effective national technology planning is becoming a success factor for increasing the national competitiveness in not only developed but also developing economies. Governments worldwide are playing a vital role in supporting technology research and development activities in their countries. The effective national technology policies and strategies should go beyond merely identifying the critical technologies. The matter of nationally managing emerging technologies is becoming an issue, but a systematic way to evaluate them is not yet in place. Therefore, the aim of this paper is to develop a systematic process to help national decision makers define the R&D strategy and policy of emerging technologies.

HD-03.3 [R] A Realization of Pervasive Computing: Ubiquitous City

Dong-Hee Shin; Sungkyunkwan University, Korea, South

Ubiquitous technologies are becoming an increasing part of peoples lives. Issues and challenges for the development of such technologies not only encompass a broad spectrum of applications and services but also involve the envisioning of new policies and legislations that will change the way in which we live and work. This study provides an overview of the socio-technical vision of ubiquitous computing by analyzing Korea's ubiquitous city development cases. The study conceptualizes ubiquitous computing by illustrating current ongoing projects in order to give socio-technical insights on the nature and scope of ubiquitous computing. This study illustrates how ubiquitous computing is interpreted and reflected in South Korea's policy-making arena. The findings of this study provide a prospect toward a future information infrastructure in the context of dynamic socio-technical changes.

HD-03.4 [R] The Nigerian National Innovation System: A Critical Look at Research & Development (R&D) and Innovation Capabilities in Selected Universities

Oluseyi O Ishola; National Centre for Technology Management (NACETEM, Nigeria
Ibihunle O Ogundari; National Centre for Technology Management (NACETEM, Nigeria
Willie O Siyanbola; National Centre for Technology Management (NACETEM, Nigeria

Universities and research institutes are key components of the National Innovation System (NIS) responsible for creating economic opportunities and wealth in nations. The capabilities of each component and the strength of their interactions determine the extent of wealth creation, economic development and global competitiveness of individual nations. The universities and research institutes are responsible for generating and imparting new knowledge, and within the domains of science and technology (S&T), developing new ideas that can be transformed to the market by industry. In Nigeria, budgetary allocation to S&T rose from N 1.5 billion (US$ 0.01 billion) in 1998 to N 16 billion (US$ 0.11 billion) in 2006, representing a 730 percent increase in eight years. As impressive as the figures look, they represented only 0.11 percent of GDP. Furthermore, Nigeria only accounts for 0.01 percent of global expenditure on R&D, her Global Competitiveness Index (GCI) ranking is 94 (out of 134 nations), and she has no university in the worlds top 500. Nigeria has aspirations to be one of the top 20 world economies by 2020, creating two key issues: a need for massive investment in S&T R&D over the next decade and strategic opportunities for researchers in R&D and new product development. A critical concern is knowing the capability of the Nigeria university researcher to effectively harness these opportunities and marshal Nigerias economic revolution. This study examines R&D capabilities and productivity in S&T in selected Nigerian universities and research institutes and shows existing interactions among researchers, their linkages with government and industry, and factors militating against productive R&D for economic development in the country with the aim of providing critical information for policy.

HD-04 Intellectual Property - 2 Thursday
7/22/2010, 13:00 - 14:30
Room: Similan 2
Chair(s) Hans J Thamhain; Bentley University

HD-04.1 [R] A Qualitative Examination of Movie Piracy Behaviors and Their Impact

Kerry-Ann White; Polytechnic Institute of New York Univ, United States
Bharat Rao; Polytechnic Institute of New York Univ, United States

The piracy of copyrighted movies in the digital disc format at any stage of the motion picture industrys value chain without permission of the copyright holders is an ongoing problem that is prevalent and adversely impacts industry revenues. Drawing on the Theory of Planned Behavior, we qualitatively examine the factors impacting domestic movie piracy behaviors in US respondents between 17 and 70 years of age. We discuss differences across groups and examine the underlying rationale for piracy behaviors. In order to move closer to mitigating some of the damages caused by movie piracy, it is recommended that the Motion Picture Association of America (MPAA) should find ways to communicate with each group through effective marketing, education and enforcement of its piracy policies and penalties.

HD-04.2 [R] Network of International Intellectual Property Rights Research Activity for National IP Policy

Hajime Sasaki; The University of Tokyo, Japan
Ichiro Sakata; The University of Tokyo, Japan
Yuya Kajikawa; The University of Tokyo, Japan
Hironori Tomobe; The University of Tokyo, Japan

While the significance of innovation is on the increase in society and the economy, it is a pressing issue to understand the field of intellectual property rights (IPR) panoramically; however, almost no such meta-structure in theory has been introduced to this present day. The authors have analyzed academic papers in the IPR field to identify the areas and issues discussed in the field, and to present the latest research field in IPR. Specifically, we recognized the meta-structure of academic research in the field of IPR that employs the network analysis method. Using the ISI Web of Knowledge, an academic research database, we conducted a panoramic analysis of IPR research in the work published from 1956 through citation analysis. As a result, 3,833 academic papers were extracted as the largest connected component of the network of IPR. We divide it into five main clusters. We also discovered that there is a chasm in citation among the fields. Through a time series analysis, we identified academic activity and patent as the recently growing research field. We thus succeeded in the systematic identification of the entire cumulative picture of academic knowledge in this field, which is vital for the future reform of IPR systems.

HD-05 Innovation Management - 7
Thursday, 7/22/2010, 13:00 - 14:30
Room: Arcadia Hall 1
Chair(s) Manabu Eto; Hitotsubashi University

HD-05.1 [R] Lean Principles Creating an Innovation Environment

Alvair Silveira Torres Jr.; University of São Paulo, Brazil
Sergio L Stumpf; SENAI, Brazil

The paper is about the organizational innovation using the toyotist principles of lean business in a company of automotive batteries in Brazil. The objective was to study the application of those principles in a particular situation not specified in the literature: a familiar company in an emergent country. The organization has five percent of the Brazilian market and competes with big international companies. In a scenario of world crises in 2008 and strong competitiveness, the company needed to increase its performance. The action research method was chosen to guide the investigation once the company needed an intervention in its organizational reality. During the period 2008-2009, the research group worked in two phases. The first aimed to diagnose the situation using toyotist principle to reveal problems in each work place by a set of participative decision making tools. In the second phase the group established the nemawashi process, an internal negotiation, to build a new operational strategy. As a result the company had expressive improvements, emerging peculiar structure in which the innovation in operation has been spread to all company. There is a motivational environment, not planned, that is a product of the application of lean business principles, which is according to theoretical prevision of sociobiological theory from Lawrence and Nohria about four basic drives to explain human behavior: acquiring, bonding, learning and defending.

HD-05.2 [R] High Performance Work Systems and Organizational Innovative Capabilities in the PRC: The Mediating Role of Intellectual Capital

Shuai Chen; Zhejiang University, China
Duanxu Wang; Zhejiang University, China

The purpose of this study is to develop a systematic understanding of the mechanisms by which high performance work systems (HPWS) facilitate organizational innovative capabilities. Using a knowledge-based view of the firm, we introduce the important role of intellectual capital in examining that issue. Drawing on empirical analysis conducted at 164 Chinese firms, the results confirm that HPWS influence organizational innovative capability through different dimensions of intellectual capital (human, organizational and relational capital). We find that organizational capital and relational capital mediates the relationship between HPWS and innovative capabilities. Contrary to the hypothesis, human capital does not play a mediating role in that relationship. Our findings support, as well as extend, the strategic human resource management (SHRM) literature and resource-based view (RBV) of the firm as to whether, why and how HPWS can develop a competitive advantage based on innovation.

HD-05.3 [R] Defining the Role of Government in TIS Case Study: Government Organizations for the Development of Technology in Iran

Kamal Mohamadi; Allame Tabatabaee University, Iran
Nasser Bagheri Moghaddam; Allame Tabatabaee University, Iran
Mohamad Mahdi Jafari; Amirkabir University of Technology, Iran

The technological innovation system (TIS) is a concept developed within the scientific field of innovation studies which serves to explain the nature and rate of technological change. A TIS can be defined as a dynamic network of agents interacting in a specific economic/industrial area under a particular institutional infrastructure and involved in the generation, diffusion, and utilization of technology. On the other hand, governments have four major roles in the development and achievement of national goals and plans of a country which include policy making, regulation, facilitation and service provision. Today, many believe that some of the national goals and plans, including the development of hi-tech technologies, would not be possible without government support and intervention because of market failure and lack of necessary infrastructures. In this paper, we will try to present an institutional mapping of the role of governments and the applications of TIS as well as the current status of hi-tech technologies in Iran.

HD-06 Technology Management in Energy Industry - 2
Thursday, 7/22/2010, 13:00 - 14:30
Room: Arcadia Hall 2
Chair(s) Terry Oliver; Bonneville Power Administration

HD-06.1 [R] A Research on the Identification of Key Uncertainty Factors for Prospecting the Future Energy Efficient Society in Korea

Byung-Yong Hwang; KISTEP, Korea, South
Han-Lim Choi; KISTEP, Korea, South
Sang-Sung Nam; KISTEP, Korea, South

The purpose of this study is to prospect the future energy efficient society in Korea. For this, uncertainty factors from the political, economic, social, ecological, and technological viewpoint were examined, and especially the key uncertainty factors from these were identified. The global economic trends, industrial structure change and energy price system were found to be the key uncertainty factors in the field of energy efficiency in Korea. In this regard, the results can provide the various implications to improve the future foresight methodology and to establish the government policy in the energy sector in Korea.

HD-06.2 [R] The Selection of Partners in Non-equity Bilateral Alliances: Some Qualitative Evidences from the Brazilian Petrochemical Leader

Marcos P Garcez; FEA-University of Sao Paulo, Brazil

Roberto Sbragia; FEA-University of Sao Paulo, Brazil
Isak Kruglianskas; FEA- University of São Paulo, Brazil

Due to the scarcity of resources, the need to foster the developments and the lack of some competencies internally, companies are forced to cooperate with other companies, universities and external agents, even individuals, as suggested by the Open Innovation paradigm. This paper address the partner selection stage in non-equity bilateral alliances projects, under the point of view of the parent company, taking into account some factors, such as the kind of competencies searched, the type of the partner and the type of innovation project carried out. The empirical data come from one case study in the biggest Brazilian petrochemical company, where we analyzed in-depth 20 alliances projects carried out with different types of partners, competitors, customers, suppliers, universities; and showing different innovativeness degree - incremental innovation, platforms of products, breakthrough and basic science. Founded on the resources based view and knowledge based view backgrounds, it was possible to identify certain specific domains for the types of alliances, along the exploitation-exploration continuum. This preliminary evidence has enabled the building of several hypotheses to be tested in one on-going quantitative research focused in the Brazilian chemical sector.

HD-06.3 [R] Investment Decisions in the Renewable Energy Field: An Analysis of Main Determinants

Andrea Masini; London Business School, United Kingdom
Emanuela Menichetti; University of St. Gallen, Switzerland

Renewable energy technologies (RET) have the potential to satisfy a significant share of the global energy supply, thus contributing to achieve climate mitigation goals. RET can also accelerate the recovery from the current economic crisis thanks to the many environmental, economic and societal benefits that such technologies incorporate. However, traditional accounting methods largely overlook the positive externalities generated by RET and therefore tend to favor conventional energy sources over capital-intensive, alternative energy technologies. Even worse, RET still suffer from a series of biased perceptions and preconceptions that favor status quo energy production models over innovative alternatives. This perspective can help explain why investments in RET, although appealing, still remain below expectations. In order to better understand this phenomenon, we focus on the investment decision-making process of a sample of investors with the objective to identify the main determinants of their choices. We propose and test a conceptual model which investigates the role of institutional and behavioral factors in determining the share of renewable energy technologies in the investment portfolios, as well as the degree of technological diversification of these portfolios. Based on the results of our analysis, we derive and discuss implications for scholars, investors, and policy makers.

HE-01 Strategic Management of Technology - 3
Thursday, 7/22/2010, 15:00 - 16:30
Room: Ballroom A
Chair(s) Hans J Thamhain; Bentley University

HE-01.1 [R] Strategic Issues in Global Technological Innovation Projects

Marcos R Piscopo; Bentley University and University of Sao Paulo, United States
Roberto Sbragia; University of Sao Paulo, Brazil
Hans J Thamhain; Bentley University, United States

This article aims to identify those issues present in global technological innovation projects carried out by Brazilian multinational companies and which performance criterions these undertakings have met. Besides that, we also sought to understand how strategic issues influence project performance in multinational companies. We have investigated 36 global technological innovation projects from Brazilian multinational enterprises through a web survey. Findings show that these companies have gone beyond the traditional iron triangle to evaluate their technological efforts and considered additional performance dimensions such as customer satisfaction, business results, and preparation for the future. Results also show a high degree of presence for issues emerging from R&D activities, industry, and the external environment; a moderate degree of presence for issues emerging from both the project and R&D activities; and a low degree of presence for issues emerging from the headquarters and subsidiaries. Regression outputs show that project performance has been impacted under the following dimensions: business results, organizations capabilities, marketing focus, and synergy among organization units.

HE-01.2 [R] Business Models in Technology-Based Firms: A Cognitive Approach to Regional Differences

Ricardo Arechavala-Vargas; Universidad de Guadalajara, Mexico
Ian P McCarthy; Simon Fraser University, Canada

The business model concept has only recently been discussed in the research literature. Some authors have pointed out that it is a second-order construct and have examined its theoretical underpinnings as a cognitive mechanism for opportunity perception and identification, using it as a tool to systematically approach the analysis of the beliefs and decisions that entrepreneurs use in building their businesses. We present a theoretical model that contributes to this prior work in three respects: a) it is explicitly applied to the analysis of technology-based firms, b) it identifies key regional factors that differentiate the entrepreneurial context in different parts of the world, and c) it portrays the relationship these regional factors have to different elements of business models in technology-based firms. We combine the cognitive role of business models with a regional context view in order to analyze the structure and process by which entrepreneurs focus on or ignore different aspects of a business model at different times. To illustrate the our model we provide case data to illustrate how entrepreneurs from two different regions Western Mexico (Jalisco) and Western Canada (British Columbia) use and rely on different elements of business models, and to exemplify how differences in the cultural, technological and industry context of our case study firms influence different elements of the business model.

HE-01.3 [R] The Linkage of Technology Strategy and Overall Strategy of Multi Business Diversified Groups: Literature Review and Theoritical Framework

Mohammad Reza Arasti; Sharif University of Technology, Iran
Mahdi Khaleghi; Malek-Ashtar University of Technology, Iran
Javad Noori; Sharif University of Technology, Iran

This article deals with technology strategy and its linkage with overall strategy in multi-business, diversified groups. In the last two decades, the alignment of technology and business strategy has been one of the important research fields in strategy and technology management scopes. This research has been concentrated on single companies through which different frameworks, models and decision support tools have been developed and widely utilized by industries. Although multi-business and diversified groups play an important role in global and national economics and need a comprehensive and overall plan for the management of their diversified technological assets, there is little research focused on corporate level technology strategy. The aim of this paper is to introduce a preliminary framework, based on a literature review with a deductive approach and content analysis method. For this purpose, more than 100 references from different fields such as MOT (especially related to technology strategy), corporate strategy and corporate management (especially related to parenting and diversification strategy) have been reviewed and analyzed. This study shows that the concept of technology strategy at the corporate level has been acknowledged by many scholars in the field of strategy and technology management. The necessity of its linkage with corporate strategy has also been emphasized. By reviewing the references, we have clarified the elements of technology strategy at the corporate level and their linkage with corporate strategy. A conceptual framework is then proposed which can be used as a basis for further research.

HE-02 Knowledge Management - 2
Thursday, 7/22/2010, 15:00 - 16:30
Room: Ballroom B
Chair(s) Anicet Yalaho; University of Jyväskylä

HE-02.1 [A] Knowledge Management Applications in a Mexican Company

Enrique Martinez; CENAM S. C. and IIIFAC, Mexico
Celso Garrido; Universidad Autónoma Metropolitana , Mexico

In the last years, the concepts about knowledge management have been increasing in Mexico, and some companies have started to create their own models to share knowledge and to promote innovation with different technology strategies, like some software solutions, where every employee can share his experience and knowledge as a fundamental issue to create their own companys innovation. The purpose of this paper is to show that there are autonomous models based on the Mexican organizational culture that are combined with a technology solution as an alternative to create competitive advantages, not only in the domestic market but also in international markets, with successful results. Some details about these models are discussed.

HE-02.2 [R] Identifying and Measuring Reach and Richness: Toward a Knowledge Sharing Mechanism Selection Model

Kah Hin Chai; National University of Singapore, Singapore
Wenting Liu; National University of Singapore, Singapore

The paper proposes a framework which connects knowledge sharing mechanisms with the knowledge awareness and transfer stages for better intra-firm knowledge sharing. This study provides an empirical foundation on how to select cost effective and efficient knowledge sharing mechanisms within an organization. Two dimensions, namely Reach and Richness, characterize the nature of the knowledge sharing mechanisms. Survey results gathered partially confirm the hypotheses that mechanisms with a high degree of Reach are more likely to be used at the awareness stage, while mechanisms with a high degree of Richness are more likely to be used at the transfer stage. Additionally, it is hypothesized that these relationships are moderated by the users temporal behavior.

HE-02.3 [A] Evaluation of the Integration Supply Chain through Radio Frequency Identification (RFID) from Knowledge Management Perspective

Erika K Ikeda; Sao Paulo University, Brazil
Tamio Shimizu; Sao Paulo University, Brazil
Fernando Laurindo; Sao Paulo University, Brazil

The objective of the paper is to evaluate how the supply chain integration generates information and how the knowledge can be created to influence the performance and to bring sustainable competitive advantage through technologies like RFID (Radio Frequency Identification). New technologies can speed up the information flow and data capture, but they are not enough to guarantee high performance neither competitive advantage for supply chains. The technology allied to knowledge management and cultural aspects may overcome the communication barriers in order to build a single unit of common interests and objectives and may remove uncertainties of the operation. A proposed framework was build to structure value capture of technologies with knowledge distribution and effective actions in supply chains based on a studied case.

HE-02.4 [R] Knowledge Management: An Application

Jose Lamas; University of Lima, Peru
Pedro Martinez; University of Lima, Peru

Many data mining applications in various domains present great interest for practitioners. This study exhibits one such real-life application that also has implications on human lives. This application is executed on patients databases. Valuable lessons are learned from this application. In particular, we discover that the often neglected pre-processing and post-processing steps in data mining are the most critical elements in determining the success of real-life data mining applications. In this paper, we discuss: (1) how to carry out this process on a patient database; (2) mining concerns related to health applications.

HE-04 Manufacturing Management - 1
Thursday, 7/22/2010, 15:00 - 16:30
Room: Similan 2
Chair(s) Nathasit Gerdsri; College of Management, Mahidol University

HE-04.1 [R] Comparative Analysis of Work Force Management Techniques between Lean and Traditional Manufacturing Companies: A Quantitative Decision Tool for Choosing between Layoffs and Continual Improvement

Cory Hallam; University of Texas at San Antonio , United States
Susan Hammond; University of Texas at San Antonio, United States
William T Flannery; University of Texas at San Atonio, United States

The Toyota Production System (TPS) has long touted the workforce management technique of continual improvement in the face of economic downturns. This is counter to a more general approach of short-term and long-term layoffs in manufacturing, associated with more traditionally managed companies. This paper builds a quantitative decision tool for choosing between layoffs and continual process-based improvement associated with a TPS or lean manufacturing strategy. The model is then used with typical automotive manufacturing data to determine key productivity variables and their effect on net present value of the management decisions associated with either strategy. The main economic drivers of the model focus on the productivity of the employees and the duration of the shutdown, or revenue gap, associated with the company. The model quickly demonstrates crossover points that identify clear management horizons for planned and unplanned shutdowns, and at which point the two strategies cross value, thus defining the timeframe in which they are the winning strategy.

HE-04.2 [R] Analysis of the Toyota Production System and the Genesis of Six Sigma Programs: An Imperative for Understanding Failures in Technology Management Culture Transformation in Traditional Manufacturing Co

Cory Hallam; University of Texas at San Antonio , United States
Justin Muesel; University of Texas at San Antonio, United States
William T Flannery; University of Texas at San Atonio, United States

The principles of the Toyota Production System (TPS), or Lean manufacturing, are well known in the auto manufacturing industry. Many companies, utilizing aspects of the TPS, focus on creating higher quality products and, at the same time, less waste in ever increasingly competitive global markets. Since the advent of Six Sigma programs, many companies have identified themselves as being a lean manufacturer or a Six Sigma company, and in some cases both. This study explores the root of the TPS and how the Six Sigma programs represented today are simply a re-branding of statistical process control (SPC), which was incorporated in the TPS from the work of Shewhart and Deming in the earlier half of the last century. Furthermore, an exploration of the tools and behaviors utilized in the TPS that do not appear in Six Sigma programs will show the limitations associated with a narrow improvement program based solely on Six Sigma technology management practices. Finally, a proposed behavioral management model for understanding the layers of tools and actions necessary to deploy a comprehensive TPS-style manufacturing enterprise is presented.

HE-04.3 [R] Total Factor Productivity Measurements: Theoretical and Empirical Analysis of Manufacturing Industry in Japan and Malaysia

Behrooz Asgari; Ritumeikan Asia Pacific University, Japan
Raynon Wong; Ritumeikan Asia Pacific University, Japan

Total factor productivity (TFP), a productivity measure which considers all factors of production, provides a more reliable analytical framework for the most empirical research on productivity. A production function postulates a clear relationship between a vector of maximum producible output versus a vector of production factors (input). Prior analyses of TFP changesusing either parametric or non-parametric approacheshave identified the change in TFP as the change in output controlling for input levels, i.e. the vertical shift of production function. The resulting estimates have been useful for policy formulations. In this study, both parametric, i.e. Cobb-Douglas and Trnqvist Index, and non-parametric, i.e. data envelopment analysis (DEA), approaches will be used to analyze and compare the TFP of the manufacturing industries in Japan and Malaysia at the respective countrys 3-digit level of industrial classifications, over the period of 1981 to 2006. Unlike the parametric approach, which assumes that firms are technically efficient, the non-parametric approach takes a more relaxed perspective, which assumes otherwise and permits TFP to be decomposed

into technical change and technical efficiency change. To remove fluctuations in currency exchange and inflation, constant currency values will be used based on industrial-specific producer price indices (PPIs). As such, the congruency of data analysis can be verified using two different methodologies: apple to apple. This study specifically measures Japans manufacturing TFP trend throughout the years; from its boom (1980s), its decline during the Bubble Burst (1990s), to its recovery (2000s) and what possible factors that might have contributed to them. Simultaneously, a comparison is done with Malaysias manufacturing TFP during the similar period. We will also see how technical and scale efficiency, with competition within the manufacturing industry, can influence manufacturing TFP between the two countries throughout this period. Based on this, policy suggestions will be formulated with the assumption to increase the TFP for both countries. What lessons that could be learned from each other, with Japan considered as the leader and Malaysia as a follower.

HE-05 Innovation Management - 8
Thursday, 7/22/2010, 15:00 - 16:30
Room: Arcadia Hall 1
Chair(s) Alvair Silveira Torres Jr.; University of Sao Paulo

HE-05.1 [A] Promotion and Obstacles in Testing Standards Innovations

Manabu Eto; Hitotsubashi University, Japan

Standard setting has effects not only on encouraging innovation but also retarding from it. It is known that product standards urge the popularization of the product and promote innovation while they cause market lock-in to this product. Moreover, choosing technology by product standardization would create innovation by promoting product development for the next generation. However, the effect of testing standards on innovation has not been discussed so far. Testing standards are just known for their effect of activating the competition in the testing method and encouraging products differentiation. This research demonstrates, by showing a LCD case, the fact that testing standards encourage R&D in specific fields, and they would cause some effects such as: 1) Differentiation competition will continue into over spec area when testing standards encourage differentiation; 2) Testing standards will deprive incentive for technology development and stop the technology development when testing standards are old and do not correspond to the technology development level; and 3) Testing standards will not be used when their appeal to consumers is poor though it could be evaluated correctly.

HE-05.2 [R] Internal Impediments of Organizational Innovation: An Exploratory Study

Chien Chiang Lin; Shih Hsin University, Taiwan
Ju Lie Yeh; Shih Hsin University, Taiwan
Guan Wen Hung; Shih Hsin University, Taiwan

Academic research and practical experiences have proven that innovation is a critical issue facing the dynamic fierce competition in the global marketplace; therefore, organizations decided to devote resources to promote and encourage innovative behaviors. However, many challenges might impede the success of organizational innovation; in order to prevent unnecessary failure, companies should not thoughtlessly implement organizational innovation programs. For that reason, understanding internal impediments would be fruitful for companies trying to improving innovative performance. The only way to smoothly accomplish organizational innovation is to eliminate all possible impediments. Based on the review of previous studies about the effects of innovative behaviors on organizational performance, the authors tried to figure out possible impediments of failed innovative activities and analyzed the causality between different impediments and innovative behaviors. The results separated organizational innovation into three stages: innovative intention, innovative process, and innovative outcome. Four direct impediments and four indirect impediments were found in the current study. By thoroughly understanding the internal impediments, practitioners might get better chance to enjoy the success of organizational innovation.

HE-05.3 [R] The Stochastic Frontier Analysis on Management Incentives and Firm Efficiency

Weifeng Yao; Shenzhen Institute of Information Technology, China
Xiaobo Chen; Shenzhen Institute of Information Technology, China

The authors set up a stochastic frontier model to make an empirical study on the nexus between management incentives and firm efficiency in the Chinese household electricity appliance industry from 2001 to 2006. Firstly, this paper theatrically discusses two types of incentives and their roles on firm efficiency, one of which is internal incentive that involves the management stockholding and management average wages; the other of which is external incentive that involves both pressures from capital market and product market. Secondly, the research based on the sample of listed companies can not testify the estimate that management stockholding plays a positive and significant role on firm efficiency. But on the other hand, the management average wage promotes firm efficiency significantly and positively. It is therefore indicated that, compared with stock, cash incentive is a relatively better practical incentive in the Chinese household electricity appliance industry. Thirdly, on the external incentives, it is indicated that both capital market pressure and product market pressure can promote firm efficiency to make it grow positively and significantly. Furthermore, it is evident that the pressure from the capital market can better discipline the management team of listed companies than the pressure from the product market in the Chinese household electricity appliance industry.

HE-06 Technology Management in Energy Industry - 3
Thursday, 7/22/2010, 15:00 - 16:30
Room: Arcadia Hall 2
Chair(s) Isak Kruglianskas; São Paulo University

HE-06.1 [R] The Ethanol Supply Challenges in Brazil

Paulo T Nascimento; University of Sao Paulo, Brazil
Abraham Sin Oih Yu; University of Sao Paulo, Brazil
José J Marques; Braskem, Brazil
Leandro J Morilhas; University of São Paulo, Brazil
Alceu S Camargo Jr.; University of São Paulo, Brazil

Oil is currently the target of criticism and concerns over the issues of greenhouse gas emissions, escalating prices and decreasing availability. Brazil, since 1975, has been encouraging ethanol use as a bio alternative, either as a substitute or as an additive to gasoline. The launching in 2003 of vehicles that can run on any proportion of ethanol and gasoline reinforced this process. These flex fuel light vehicles are already 33 percent of the nations 25 million fleet, and flex fuel car sales are about 91 percent of new vehicles. These cars have created a self-regulated market. Whenever ethanol prices rise too high, the consumer switches to gasoline, forcing it down again. Sugarcane, the source of Brazilian ethanol, is a long-standing feature of the economy, almost since Portuguese discovery. There is no land shortage in view, since sugarcane uses only 3 percent of the countrys 340 million hectares of arable land. Still, are there challenges to meet the 18 percent yearly increase rate of domestic consumption? Today the only limits seem to be lack of capital and much reduced oil prices, both not seen in the foreseeable horizon.

HE-06.2 [R] The Technological Strategy of Brazilian Automakers for Flex Fuel Vehicles: An Exploratory Study

Paulo T Nascimento; University of Sao Paulo, Brazil
Abraham Sin Oih Yu; University of Sao Paulo, Brazil
Lydia L Silva; University of São Paulo, Brazil
Francisco Starke; University of São Paulo, Brazil
Carlos Henrique B Morais; University of São Paulo, Brazil
Luciana L Silva; University of São Paulo, Brazil
Alcione P Silva; University of São Paulo, Brazil

Brazil began its experience on biofuel-run cars in the 1970s when a government program, Pr-Alcool, meaning Alcohol Program, stimulated automakers with an industrial presence in the country to develop and manufacture cars to run on hydrated ethanol (5 percent water content) or a gasoline/anhydrous ethanol mix varying from 10 percent up to 25 percent (E10 to E25). Since the first model was launched by Volkswagen in 2003, flexible fuel

cars, those that run on any proportion of ethanol and gasoline, from E0 up to E100, already account for a third of the countrys light vehicle fleet. In 2009, they accounted for over 90 percent of newly produced light vehicles, making the flex-fuel fleet a fast-growing one. Brazilian automakers have clearly made differing choices concerning their technological strategy. To see this, it is enough to consider first launch, engine compression rates, fuel consumption, and emissions. We propose that in order to explain these differences, one must consider the affiliates relative importance to their multinational group, their early involvement in development of ethanol-fueled vehicles, and their differing emphasis on local R&D, as well as their headquarters differing global R&D choices.

HE-06.3 [R] Technology Development and Application of Future Hydrogen Energy Industry and Taiwan Hydrogen Industry

Chen-Chun Lin; National Chiao Tung University, Taiwan
Chih-Chung Tai; National Chiao Tung University, Taiwan
Joseph Z. Shyu; National Chiao Tung University, Taiwan

The core objective of this work is to analyze the possible future relevance of hydrogen from renewable energy sources focused on technology development and application from content analysis, and with special focus on Taiwan. This research was carried out to investigate hydrogen production, storage, delivery and application. The major conclusion of this analysis is that hydrogen is a suitable alternative energy but it still has a long way to go. We should develop different kinds of alternative energies to try to replace fossil fuels, not only hydrogen. The major reason for this is that a successful transition to the hydrogen economy requires not only advanced hydrogen technologies and application, but also a reformation of energy infrastructure and policy support. Hence, there are still limits to hydrogen economy in the future. Only after further comprehensive technological developments and corresponding favorable political support could it become a competitive energy industry in Taiwan.

HF-02 Knowledge Management - 3
Thursday, 7/22/2010, 17:00 - 18:30
Room: Ballroom B
Chair(s) Alisa Kongthon; National Electronics & Computer Technology Center

HF-02.1 [R] Technology Implementation and Group Learning

Okan Pala; Sabanci University, Turkey
Dilek Cetindamar; Sabanci University, Turkey

The current study synthesizes the literature on group learning and technology implementation and proposes an enhanced multilevel model of technology implementation. The study aims to contribute to the literature in four ways. First, the cross-level link between group learning and technology implementation is established. Second, another cross-level relationship between organizational climate and group learning is introduced. The third contribution is the introduction of a neglected antecedent of group learning, namely, the distribution of knowledge within the group. The last contribution is the addition of group level structural variables as the antecedent of the distribution of knowledge within the group.

HF-02.2 [R] Why Early Implementation of a Knowledge Management System Can Support the Growth of R&D-Driven SMEs

Michael Aagaard Nørkjær; University of Aarhus, Denmark
Henrik Scheel; University of Aarhus, Denmark
Mads Ambrosius Schjærff Sørensen; University of Aarhus, Denmark

In order to secure future growth, any R&D and technology-driven company has to manage its internal knowledge effectively. When companies grow, the need for a knowledge management system (KMS) increases. It is widely recognized that one of the major challenges when implementing a KMS is how to create a culture that supports the use of the system. Most companies struggle to make these cultural changes, which prolongs the implementation period, increases the costs and reduces the benefit of the system. This paper focuses on cultural development in small- and medium-sized enterprises (SMEs) and examines the interrelatedness of the phases for organizational growth and the timing of implementing a KMS. The research was carried out with an abductive approach using semi-structured interviews to study three SMEs with contemporary KMS problems as well as two large enterprises with previous experience implementing KMSs. Our findings indicate that companies tend to focus on the costs of the KMS, and indeed overlook the even greater costs of implementing the necessary cultural changes. The culture in the organization of a SME is organic and easy to change, which makes it inexpensive to implement the KMS. It is recommended that companies initiate the implementation of a KMS at an early stage instead of postponing the process until the need become urgent.

HF-02.3 [R] Synergizing Explorative and Exploitative Learning in Innovation: An Empirical Study

Zhaohui Zhu; Zhejiang Gongshang University, China

Continuous innovation needs the dynamic alignment of todays operational effectiveness and tomorrows strategic flexibility. This paper tries to develop continuous innovation theory by adding Marchs taxonomy of learning in continuous innovation theory and suggests that the dynamic synergy of explorative and exploitative learning is the key for continuous innovation. An empirical study suggests that there is a co-evaluation of explorative and exploitative learning, and firms should maintain a balance between exploration and exploitation dynamically for continuous innovation.

HF-03 PICMET 2011 Planning Session
Thursday, 7/22/2010, 17:00 - 18:30
Room: Similan 1
Panelist(s) Timothy R Anderson; Portland State University
Tugrul U Daim; Portland State University
Dundar F Kocaoglu; Portland State University
Liono Setiowijoso; Portland State University
Charles M Weber; Portland State University
Ann White; Portland State University

This panel session will provide a chance to give feedback on PICMET '10 as well as to get involved in the planning for PICMET '11 and '12 conferences. The next PICMET will be held July 31-August 4, 2011, at the Hilton Portland and Executive Tower in Portland, Oregon, USA. The following year in will be held in Hangzhou, China, on July 29-August 2, 2012.

HF-04 Innovation Management - 9
Thursday, 7/22/2010, 17:00 - 18:30
Room: Similan 2
Chair(s) Frederick Betz; Portland State University

HF-04.1 [R] Patent Activities and Publication Performance of Academic Scientists in the Life Science Field: Case of South Korea

Kyung-Nam Kang; Korea Institute of Intellectual Property, Korea, South
Yoon-Sik Lee; Seoul National University, Korea, South

Recently, concerns have been raised regarding the negative effects of patent activities on the scientific publication performances of academic scientists. In this study, we examined the patenting behavior of academic scientists in the life science field and the effects of patents on publication performance. Overall, 84 percent of respondents reported that they had applied for a patent, and there were statistically significant differences between university scientists and institute scientists in patent behavior and patent-related activities. Using statistical analysis, we found that patent performance and publication performance were positively correlated. Based on the results of this investigation, we concluded that patent performance does not impede but rather reinforces publication performance. However, the entrepreneurial activity of academic scientists was negatively correlated with publication performance. Therefore, adverse effects of academic entrepreneurship on research publications should be considered in-depth.

HF-04.2 [R] Empirical Study on the Relationship between R&D Investment,

Capital Structure, and Firm Size of China Private Listed Companies

Binfeng Chai; Zhejiang Gongshang University, China

The practices of Anglo-American enterprises have proven that capital structure and R&D investment have a negative correlation relationship, and the firm size makes positive and significant contribution to the R&D investment, which gives support to the Schumpeterian hypothesis to a certain degree. In fact, China's economic development is at the stage of industrialization. Whether the findings in China reach a similar experience conclusion of the relationship between R&D investment, capital structure, and firm size of China private listed Companies? Based on the data from the listed private companies (these can be divided into the founding family-controlled and non-founding family-controlled according to the different nature of their control) in China's A shares and B shares, this study made an attempt to explore the empirical relationship between R&D investment and firm size along with capital structure, in the hope that it will provide some implications for the government and enterprises.

HF-04.3 [R] Learning, Upgrading and Innovation in Nigerian Indigenous Industries

Willie O Siyanbola; Obafemi Awolowo University, Nigeria
Olumuyiwa O Olamade; Obafemi Awolowo University, Nigeria
Oluseyi O Isola; Obafemi Awolowo University, Nigeria

In spite of the increasing globalization of technology, the involvement of developing countries in producing new technologies and innovations is almost negligible. The production of technological knowledge is concentrated in industrial countries, and developing nations are still lagging behind as far as competition on the technological frontier is concerned. It is therefore imperative for developing countries to look inwards to deploy science, technology and innovation (STI) in specific areas where they have comparative advantage. These comparative advantages could then be developed to achieve competitive advantage. Indigenous technology is one of the veritable areas where these nations can derive global competitiveness. In Nigeria, the indigenous industries are as diverse as the culture of the people. Some of the common indigenous industries found in the country include: the production of pots from aluminum metal scraps, bronze casting, leather tanning, and the likes. The indigenous technologies present significant opportunities for local economic transformation and global competitiveness. This would happen if these technologies are upgraded through the deployment of science and technology. This paper presents findings from a two-year study of some major indigenous technology clusters in Nigeria.

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