



IEEM 2013

10 - 13 DECEMBER 2013 | BANGKOK, THAILAND

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Organized by : IEEE TMC Thailand Chapter
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CONFERENCE VENUE

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PROGRAM OVERVIEW

Tue – 10 Dec	Registration/ Welcome Reception/ Pre-Conference Tours
Wed – 11 Dec	Opening & Keynote Presentations Technical Sessions
Thu – 12 Dec	Technical Sessions Conference Banquet
Fri – 13 Dec	Technical visits & Post-Conference Tours (Refer to Pg. 92 for more information)



Welcome Message by Conference Chairs

The 2013 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM2013) is the seventh in the series of IEEM conferences. It is the first time the conference is organized by IEEE, jointly by Technology Management Council Thailand, Hong Kong and Singapore Chapters. The conference is supported by Thammasat University, University of Liverpool, National University of Singapore and the City University of Hong Kong.

As in the past, IEEM2013 adopted a rigorous review process has helped to maintain a high standard as for the past IEEM conferences. Each submitted paper was sent to 3-5 reviewers. The acceptance decisions were made based on at least two consistent recommendations.

The organising committee is very grateful for Professor Ghauth Jasmon, Vice-Chancellor of University of Malaya, Dr Prinya Sainamthip, Managing Director of Siam Research and Innovation, Co., Ltd. and SCG Cement Building Materials and Professor C.F. Jeff Wu, Coca-Cola Chair and Professor at Georgia Institute of Technology to deliver keynote speech at this conference. We would like to thank all the authors for their contribution and the participants for the strong support. We would also like to acknowledge the contribution by technical programme committee members and the reviewers for their help in the review process.

This proceeding contains 342 papers from almost 50 countries and regions. It covers all the areas of industrial engineering and engineering management. The papers present theoretical research results or application case studies. They range from mathematical modelling to engineering applications and management.

We hope that you enjoy the conference, and hope to meet you again in the next one in the near future.



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Keynote Presentation



Wednesday – 11 Dec 2013, 9:30 - 10:15
Le Concorde Ballroom, Level 2

Ghauth Jasmon
Vice-Chancellor
University of Malaya, Malaysia

Building and Rebuilding Universities through Engineering Education and Research

Abstract

This talk is about academic leadership.

It will provide significant insights into what it took to build the first private university in Malaysia, and to propel Malaysia's oldest and most reputable University into the elite group of top universities in the world – an experience spanning over 17 years! Both challenges demanded unique ways in terms of the policies introduced, and the targets adopted. Whilst there exist overlaps with respect to the fundamental ways in dealing with human capital, and financial resources in both cases, it is also worth identifying some key differences. The talk will highlight key policies introduced and the spillover effects resulting from being steadfast in implementing them. It will also discuss where University of Malaya will be headed in the next ten years, with particular note on its autonomy status and self financing plans.

Biography

Ghauth Jasmon is a distinguished scholar, accomplished academician and entrepreneur. Ghauth is currently the Vice-Chancellor of the University of Malaya (UM), a position he has held since 10th November 2008. Previously, he had been Founder President/CEO of Multimedia University (MMU) and Chief Executive Officer of Unity College International. A distinguished scholar, he obtained a First Class Honours Degree in Electrical and Electronic Engineering and was awarded a PhD degree (Power Systems) in July 1982 from the University of London. His academic career began with the appointment as a Lecturer in the Department of Electrical Engineering at the University of Malaya in 1982. He was appointed as the Head of the Electrical Engineering Department in 1986 to 1988. Based on his credentials, Ghauth was promoted to the rank of Associate Professor in 1989 and to Full Professor at the University of Malaya in 1992. In the same year, he was appointed as the Dean of the Faculty of Engineering and held the position until August 1995. Ghauth then was appointed as the Deputy Vice-Chancellor (Development) who is responsible for the physical development and upgrading of many physical facilities across the university. He accepted the invitation by Telekom Malaysia Berhad to set up and build Multimedia University (MMU) in Malacca, the first government-approved private university in Malaysia and became the MMU President/CEO in December 1996. In January 2008, Ghauth left MMU to join a private college, Unity College International as CEO and shareholder. As an academic, Ghauth has contributed extensively in research and in the Engineering Profession. He has conducted research in the areas Power Systems Analysis, Network Analysis, Voltage Stability, System Security and Neural Network Applications. These and other works have been published in more than 30 international journal papers and 45 conference/seminars. He has also been involved in many professional engineering committees and activities especially in the IEE (UK) and IEEE (USA) and was formerly a Secretary General and Vice President of the Association for Engineering Education in South East Asia and the Pacific. He is a Fellow of the IEE, Fellow of the Institution of Engineers, Australia, a Senior Member of the IEEE and an Eisenhower Fellow. Ghauth's current mission is to transform UM into a truly world class institution and achieves this by focusing on building solid academic fundamentals within the academic and student body. He also aims to instil a higher level of entrepreneurship in the university community, establishing more active international networking and forging greater interaction between the university and industry.

Keynote Presentation

Wednesday – 11 Dec 2013, 11:00 - 11:45
Le Concorde Ballroom, Level 2

Prinya Sainamthip
Managing Director
Siam Research and Innovation, Co., Ltd.
& *SCG Cement Building Materials, Thailand*



Innovation for Sustainability: SCG Perspective

Abstract

This talk is about Innovation for Sustainability. In globalization world today, competitive landscape has changed dramatically. World is connected. Customers are king and there are many alternative brands, products, services for them to select. One-size-fit all strategy will no longer be competitive compared to the customized one. Being excellent in production, meaning cost leadership, is good but not enough for the companies to sustain in a long run. Innovations (R&D and value creation) and Marketing (Branding) will play more important roles compared to production. Companies are keen to increase customer satisfaction by differentiate from the competitors and compete on Value to Customers, not price. In SCG perspective, one of the two key strategies is to create high value added products, services, and solutions through R&D and Innovation. Another is to be ASEAN sustainable business leader through corporate governance and sustainable development. This will keep a good balance between Business and Social & Environment that will make the organization healthy in the long run.

Biography

Dr. Prinya Sainamthip is currently MANAGING DIRECTOR of Siam Research and Innovation CO., LTD., R&D unit of SCG – Cement Building Materials Group. He graduated with B.Sc (2nd class Honors), Materials Science, from Chulalongkorn University and M.Sc (Ceramic Engineering) and Ph.D (Ceramic Science) both from New York State College of Ceramics, Alfred University, Alfred, N.Y., USA. He has also attended various Management Courses, such as Wharton Executive Education, Pricing Strategies Measuring, Capturing and Retaining Value, The Wharton School, University of Pennsylvania, Executive Programs, Creating the Market-Focused Organization, Kellogg School of Management, Northwestern University, Advanced Management Program, Harvard Business School, Harvard University. His work experiences include Research Scientist, Enichem America Inc., NJ., USA. , Managing Director, Thai Ceramic Co., Ltd. (COTTO Brand). He has also served on the Board of Directors, National Metal and Materials Technology Center (MTEC), on National Science and Technology Development Agency (NSTDA), as Vice Chairman: Technology Innovation Management Group, Thailand Management Association (TMA), and on International Advisory committees, Department of Materials Science, Faculty of Science, Kasetsart University. Sample of his Publication is “Process for preparing a novel superconductor with high density and hardness using heating steps and high pressure compacting”, Taylor; Jenifer (Almond, NY); Sainamthip; Prinya (North Brunswick, NJ); Dockery; David F. (Alfred Station, NY) United State Patent 4971946.

Keynote Presentation



Wednesday – 11 Dec 2013, 11:45 - 12:30
Le Concorde Ballroom, Level 2

C.F. Jeff Wu

Coca-Cola Chair and Professor
Georgia Institute of Technology, USA

Quality Improvement: From Autos and Chips to Nano and Bio

Abstract

Quality improvement (QI) has a glorious history, starting from Shewhart's path-breaking work on statistical process control to Deming's high-impact work on quality management. Statistical concepts and tools played a key role in such work. As the applications became more sophisticated, elaborate statistical methods were required to tackle the problems. In the last three decades, QI has seen more use of experimental design and analysis, particularly the methodology of robust parameter design (RPD). I will first review some major ideas in RPD, focusing on its engineering origin and statistical methodology. I will then discuss more recent work that expands the original approach, including the use of feedback control and operating window. To have an effective solution, the subject matter knowledge often needs to be incorporated. Techniques for fusing data with knowledge will be presented. For advanced manufacturing and high-tech applications, there are new challenges and possible paradigm shift posed by three features: large varieties, small volume and high added value. I will speculate on some new directions and technical development. Throughout the talk, the ideas will be illustrated with real examples, ranging from the traditional (autos and chips) to the modern (nano and bio).

(This talk is based on the 2012 Deming Lecture given during the JSM.)

Biography

C. F. Jeff Wu is Professor and Coca Cola Chair in Engineering Statistics at the School of Industrial and Systems Engineering, Georgia Institute of Technology. He was elected a Member of the National Academy of Engineering (2004), and a Member (Academician) of Academia Sinica (2000). A Fellow of the Institute of Mathematical Statistics (1984), the American Statistical Association (1985), the American Society for Quality (2002), and the Institute for Operations Research and Management Sciences (2009). He was formerly the H. C. Carver Professor at the University of Michigan, 1993-2003 and the GM/NSERC Chair in Quality and Productivity at the University of Waterloo in 1988-1993. He also taught in the Statistics Department at the University of Wisconsin from 1977-1988. He got his BS in Mathematics from National Taiwan University in 1971 and Ph.D. in Statistics from the University of California, Berkeley (1973-1976).

He received the COPSS (Committee of Presidents of Statistical Societies) Presidents' Award in 1987, which was given to the best researcher under the age of 40 per year and was commissioned by five statistical societies. His other awards include the 2011 COPSS Fisher Lecture, the 2012 Deming Lecture, the Shewhart Medal (2008) from ASQ, the Pan Wenyan Technology Award (2008), the 1990 Wilcoxon Prize in Technometrics, the 1992 Brumbaugh Award by ASQ, the 1997 and 2004 Jack Youden Prize in Technometrics, and the Honoree of the 2008 Quality and Productivity Research Conference. He was the 1998 P. C. Mahalanobis Memorial Lecturer at the Indian Statistical Institutes and an Einstein Visiting Professor at the Chinese Academy of Sciences in 2011. He received an honorary doctor (honoris causa) of mathematics at the University of Waterloo in 2008.

Being listed as an "ISI Highly Cited Researcher", his research work is widely cited in professional journals and magazines. He has published more than 155 research articles in peer review journals and graduated 40 doctoral students. He co-authored with Mike Hamada the book "Experiments: Planning, Analysis, and Optimization" (Wiley, 2nd Ed, 2009, 716 pages) and with R. Mukerjee the book "A Modern Theory of Factorial Designs" (Springer, 2006).

ORAL PRESENTATION

1. Determine Your Audio-Visual Needs

Each meeting room comes equipped with a computer, LCD projector and screen. The computers in the meeting rooms are being provided to Windows-based PC users. The PC will be configured with Windows Operating System. Please bring your presentation files in thumb drives only. For MAC-laptop users, please bring your own VGA adapter cable.

2. Prepare Your Presentation

Length of presentation material should be in accordance with your time allotted, each oral presentation is limited to 15 minutes (including Q&A). You are kindly requested to be at the presentation room at least 15 minutes before the session starts. Please discuss the same material as reported in your abstract submission.

3. Create a Backup Copy of Your Presentation

We recommend that you bring at least 2 copies of your presentation to the meeting for backup purposes. Only thumb drives are acceptable.

4. Give Your Presentation

Be considerate to the other speakers and audience by staying within your allocated time. The allocated time for your presentation includes a discussion and a changeover to the next speaker. Session Chairs will hold you to the allotted time. This is essential to ensure adequate time for questions and discussion as well as adherence to the schedule. At the end of the meeting, all presentation files uploaded on the provided computers will be deleted.

POSTER PRESENTATION

Poster sessions will be located at Krisana of Level 2. Your assigned poster board will be marked with your Paper ID. Please feel free to approach the help desk for assistance.

1. Poster Display and Viewing

Wed – 11 Dec 13	
Thu – 12 Dec 13	
Poster Viewing from 10:30 to 11:00 and 15:00 – 15:30	Poster Set-up from 08:30 to 10:30 Poster tear down by 18:00 latest

2. Prepare Your Poster

Each presenter is provided with a 2.5 metre high by 1 metre wide poster board. Please discuss the same material as reported in your abstract submission. Vertical/Portrait format in A0 size is suggested. A0 Size Poster Measures: 841mm width x 1189mm height.

- Place your Paper Title, Paper Title and Authors' names prominently at the top of the poster to allow viewers to identify your paper easily.
- Highlight the Authors' names, e-mail and address information in case the viewer is interested in contacting you for more information.
- You have complete freedom in displaying your information in figures, tables, text, photographs, etc in the poster.
- A successful poster presentation depends on how well you convey information to an interested (but not expert) audience. You may wish to structure your poster by including the background of your research followed by results and conclusions.

3. Set Up Your Poster

- Your poster presentation time is as shown in the session schedule and the poster must be set up at least 10 to 30 minutes before your presentation.
- Interactive forum is scheduled and presenters are required to be at their posters during poster viewing times.
- Adhesive tapes and scissors are available at the Poster Help Desk, nearby the poster boards. If you have special needs for your poster presentation, please bring those supplies with you to the meeting.

4. Remove Your Poster

- Posters must be removed immediately after the end of the scheduled presentation session. IEEM2013 will not be responsible for posters and materials left on poster boards after the end of the session.

Daily Program

TIME		TUESDAY - 10 DECEMBER 2013			
13:00 - 16:30	Bangkok Temples & City Tour (Advanced booking required) (Tour departs at 13:00 sharp. Please gather at Swissotel Le Concorde Lobby, Level 1 at 12:45 and present ticket to board bus.)				
12:00 - 18:00	Registration Opens				
15:30 - 17:30	High Tea Reception				
18:00 - 21:30	Dinner Cruise by Traditional Rice Barge (Advanced booking required) (Tour departs at 18:00 sharp. Please gather at Swissotel Le Concorde Lobby, Level 1 at 17:45 and present ticket to board bus.)				
		WEDNESDAY - 11 DECEMBER 2013			
08:00 - 08:50	Registration (Re-opens at 10:30 and closes 16:30)				
09:00 - 12:30	<p>Opening & Keynote Presentations, Le Concorde Ballroom, Level 2 Keynote Presentation: "Building and Rebuilding Universities through Engineering Education and Research" Ghauth Jasmon, Vice-Chancellor, <i>University of Malaya, Malaysia</i> Pg.4 Coffee/ Tea Break (10:30 - 11:00) Keynote Presentation: "Innovation for Sustainability: SCG Perspective" Prinya Sainamthip, Managing Director, <i>Siam Research and Innovation, Co., Ltd. & SCG Cement Building Materials, Thailand</i> Pg.5 Keynote Presentation: "Quality Improvement: From Autos and Chips to Nano and Bio" C.F. Jeff Wu, Coca-Cola Chair and Professor, <i>Georgia Institute of Technology, USA</i> Pg.6</p>				
12:30 - 13:30	Lunch, Nilubon, Busakon and Sarocha Level 3				
13:30 - 15:00	Salon A	Salon B	Rachavadee	Krisana	Poster Session 1 Pg.49 - 51
	TK 1 Technology & Knowledge Management (1) Pg.31	OR 1 Operations Research (1) Pg.33	HF 1 Human Factors (1) Pg.35		
	Ubonchard	Jamjuree	Sakthong		
	SC 1 Supply Chain Management (1) Pg.37	SI 1 Service Innovation & Management (1) Pg.39	PP 1 Production Planning & Control (1) Pg.41		
	Patumchard	Satabud	Boontarik		
	EE 1 Engineering Economy & Cost Analysis (1) Pg.43	EB 1 E-Business & E-Commerce (1) Pg.45	SR 1 Safety, Security & Risk Management (1) Pg.47		
15:00 - 15:30	Coffee/ Tea Break, Krisana Level 2				
15:30 - 17:30	Salon A	Salon B	Rachavadee	Krisana	Poster Session 1 Pg.49 - 51
	TK 2 Technology & Knowledge Management (2) Pg.32	OR 2 Operations Research (2) Pg.34	DM 1 Decision Analysis & Methods (1) Pg.36		
	Ubonchard	Jamjuree	Sakthong		
	SC 2 Supply Chain Management (2) Pg.38	QC 1 Quality Control & Management (1) Pg.40	SM 1 Systems Modeling & Simulation (1) Pg.42		
Patumchard	Satabud	Boontarik			
PM 1 Project Management (1) Pg.44	RM 1 Reliability & Maintenance Engineering (1) Pg.46	GM Global Manufacturing & Management Pg.48			
18:00 - 21:30	Chao Phraya Dinner Cruise (Tour departs at 18:00 sharp. Please gather at Swissotel Le Concorde Lobby, Level 1 at 17:45 and present ticket to board bus.)				

Daily Program

THURSDAY - 12 DECEMBER 2013

THURSDAY - 12 DECEMBER 2013				
08:00 - 16:30	Registration			
09:00 - 10:30	Salon A	Rachavadee	Ubonchard	Krisana
	NSF Panel on Partnerships for Innovation Organized by Roger Jiao & Chaired by Medina-Borja, Alexandra	HF 2 Human Factors (2) Pg.56	SC 3 Supply Chain Management (3) Pg.60	Poster Session 2 Pg.84 - 86
	Jamjuree	Sakhong	Patumchard	
	QC 2 Quality Control & Management (2) Pg.64	SM 2 Systems Modeling & Simulation (2) Pg.68	PM 2 Project Management (2) Pg.72	
	Satabud	Boontarik		
EB 2 E-Business & E-Commerce (2) Pg.76	TK 3 Technology & Knowledge Management (3) Pg.80			
10:30 - 11:00	Coffee / Tea Break, Krisana Level 2			
11:00 - 12:30	Salon A	Rachavadee	Ubonchard	Krisana
	Meet-the-editor's Panel Organized & Chaired by M Xie	ET Engineering Education & Training Pg.57	SC 4 Supply Chain Management (4) Pg.61	Poster Session 2 Pg.84 - 86
	Jamjuree	Sakhong	Patumchard	
	HS 1 Healthcare Systems & Management (1) Pg.65	QC 3 Quality Control & Management (3) Pg.69	EE 2 Engineering Economy & Cost Analysis (2) Pg.73	
	Satabud	Boontarik		
RM 2 Reliability & Maintenance Engineering (2) Pg.77	SR 2 Safety, Security & Risk Management (2) Pg.81			
12:30 - 13:30	Lunch, Nilubon, Busakon and Sarocha Level 3			
13:30 - 15:00	Salon A	Salon B	Rachavadee	Krisana
	TK 4 Technology & Knowledge Management (4) Pg.52	OR 3 Operations Research (3) Pg.54	DM 2 Decision Analysis & Methods (2) Pg.58	Poster Session 2 Pg.84 - 86
	Ubonchard	Jamjuree	Sakhong	
	SC 5 Supply Chain Management (5) Pg.62	HS 2 Healthcare Systems & Management (2) Pg.66	PP 2 Production Planning & Control (2) Pg.70	
	Patumchard	Satabud	Boontarik	
IP Information Processing & Engineering Pg.74	RM 3 Reliability & Maintenance Engineering (3) Pg.78	IS Intelligent Systems Pg.82		
15:00 - 15:30	Coffee / Tea Break, Krisana Level 2			
15:30 - 17:30	Salon A	Salon B	Rachavadee	Krisana
	TK 5 Technology & Knowledge Management (5) Pg.53	OR 4 Operations Research (4) Pg.55	DM 3 Decision Analysis & Methods (3) Pg.59	Poster Session 2 Pg.84 - 86
	Ubonchard	Jamjuree	Sakhong	
	SC 6 Supply Chain Management (6) Pg.63	SI 2 Service Innovation & Management (2) Pg.67	PP 3 Production Planning & Control (3) Pg.71	
	Patumchard	Satabud	Boontarik	
FP Facilities Planning & Management Pg.75	RM 4 Reliability & Maintenance Engineering (4) Pg.79	MS Manufacturing Systems Pg.83		
17:30 - 21:30	Conference Banquet at Siam Niramit (Please gather at Swissotel Le Concorde Lobby, Level 1 at 17:30 and present ticket to board bus.)			

Conference Banquet



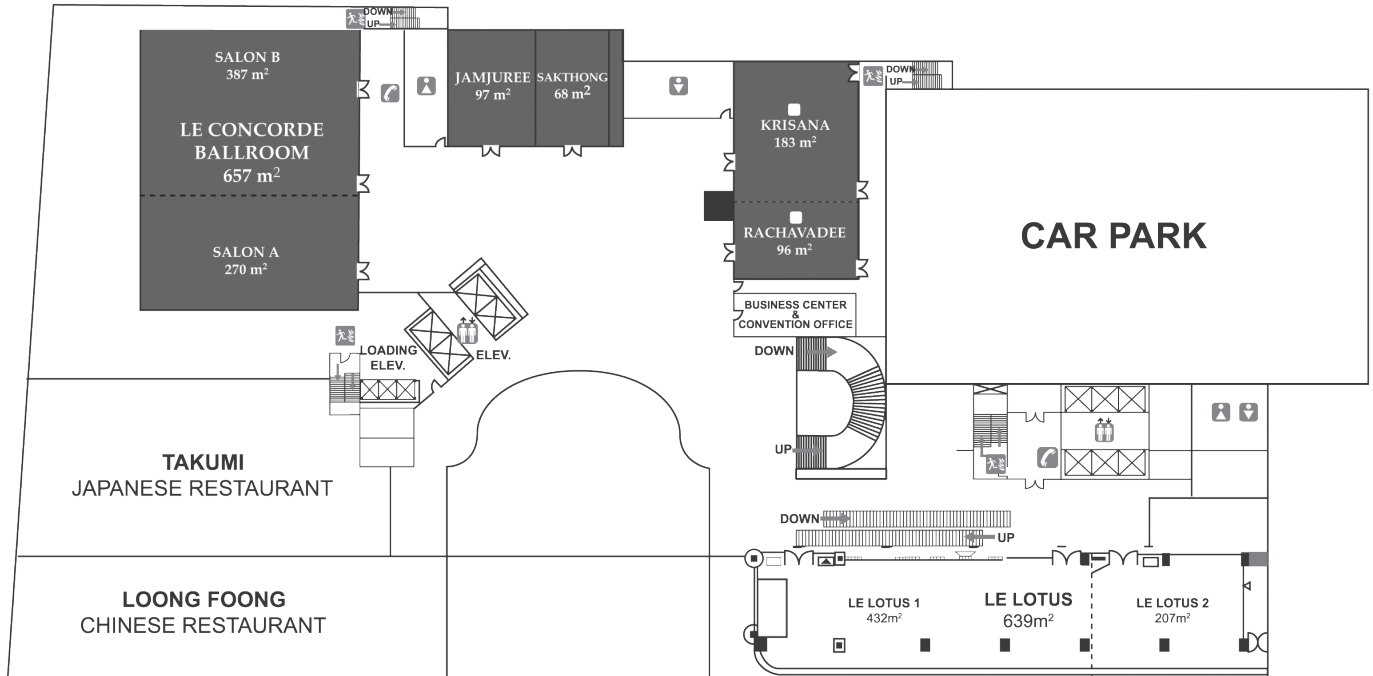
Dinner Buffet cum Siam Niramit Performance | Thursday, 12 December, 2013 (5.30PM to 9.30PM)

An extravagant show about the history of Thailand that involves stunning costumes, skillful dancers, entertaining music, state-of-the-art techniques and cutting-edge light and sound system.

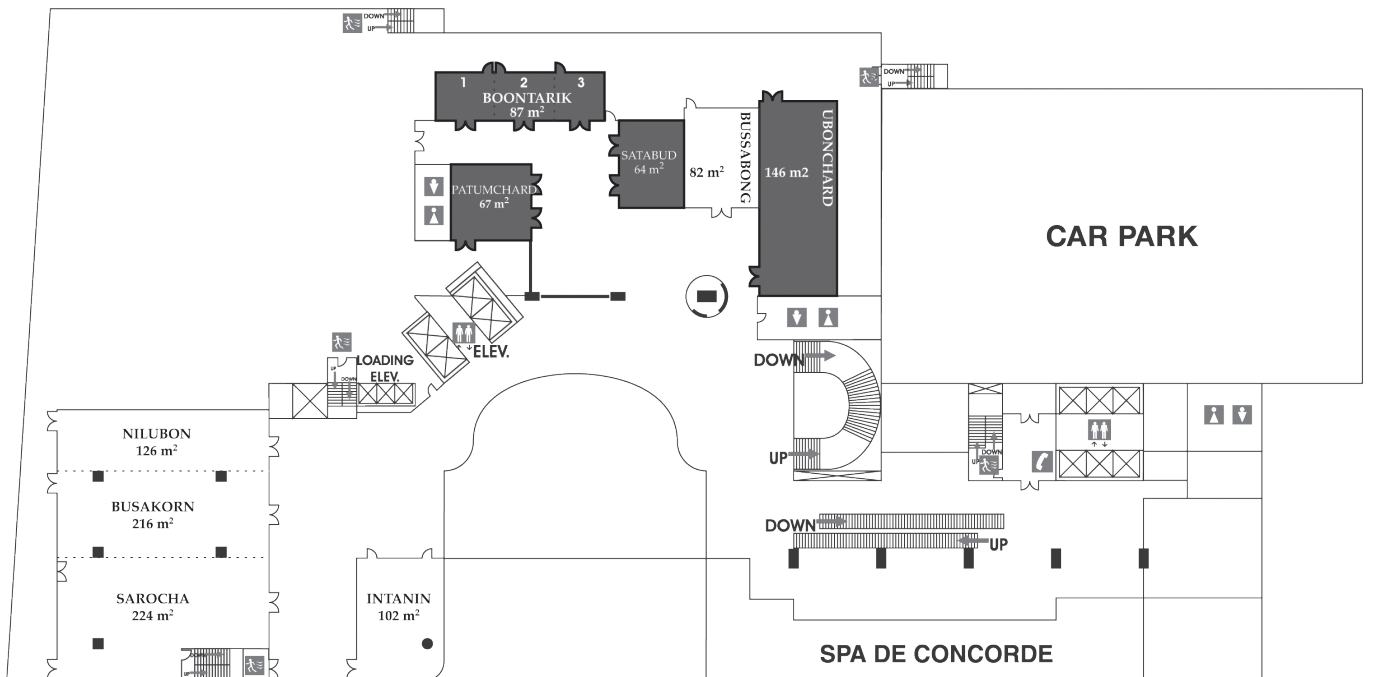
PROGRAM (Actual May Vary)	
5:30 pm	Gather at hotel lobby on the ground floor for departure to the dinner venue
5:45 pm	Thai Style Dinner Buffet (Non-halal, Non-vegetarian) <i>Note: Vegetarian meals can be catered but will require advance order.</i> Please submit your request online at the time of registration
7:15 pm	Visit "Thai Village of the Four Regions" and get a real taste of Thai life in bygone times. Here you will see demonstrations of traditional Thai arts and crafts such as Thai silk weaving, Batik painting, authentic Thai massage, the preparation of Thai desserts and outdoor performance etc.
7:40 pm	Proceed to the Theatre (deposit camera and video recording)
8:00 pm	Siam Niramit performance, the must-see show of Thailand "Journey to the Enchanted Kingdom of Siam" <ul style="list-style-type: none"> • Scene 1: Faith... The Ancient Kingdom of Lanna • Scene 2: The South Sea... Traders from Overseas • Scene 3: Isaan... Heritage of the Khmer Civilization • Scene 4: The Mighty Capital... Ayutthaya "Journey Beyond Imagination: The Three Worlds" <ul style="list-style-type: none"> • Scene 1: Fiery Hell... • Scene 2: Mystical Himapaan • Scene 3: Blissful Heaven... "Journey Through Joyous Festivals"
9:30 pm	Show ends Depart Siam Niramit (Return to hotel)

Floor Plan

Level 2



Level 3



TK 1 Technology & Knowledge Management (1)

12/11/2013 13:30 - 15:00
Room: Salon A

Chairs: Tuomo Kassi
Susan Morton

Abstracts: see page 31

Business Management and Mobile Experience

Riccardo Cognini, Roberto Gagliardi,
Alberto Polzonetti
University of Camerino, Italy

Organizational Innovation through Knowledge Taxonomy Model

Iwan Inrawan Wiratmadja¹, Augustina Asih Rumanti², Trifenaus Prabu Hidayat²
¹*Bandung Institute of Technology, Indonesia*
²*Atma Jaya Catholic University of Indonesia, Indonesia*

Research on the Strategy of Patents Layout Basing on TRIZ

Hui Li, Runhua Tan, P. Jiang, H.G. Zhang
Hebei University of Technology, China

Individual Tacit Knowledge for Organization's Competitive Advantage

Augustina Asih Rumanti¹, Iwan Inrawan Wiratmadja²
¹*Atma Jaya Catholic University of Indonesia, Indonesia*
²*Bandung Institute of Technology, Indonesia*

Fostering Interdisciplinary Integration in Engineering Management

Tobias Vaegs, Inna Zimmer, Stefan Schröder, Ingo Leisten, R. Vossen, Sabina Jeschke
RWTH Aachen University, Germany

Organizational Culture, Inter-organizational Learning Ability and Innovation Performance of the Technology Alliance of Small and Medium Enterprises

Xiaodi Zhang¹, Zhanxing Zheng², Kexin Huang¹, Ping Wang¹
¹*Northwestern Polytechnical University, China*
²*AVIC Shaanxi Aircraft Industry(Group) Corporation Ltd, China*

TK 2 Technology & Knowledge Management (2)

12/11/2013 15:30 - 17:30
Room: Salon A

Chairs: Roula Michaelides
R. Kant

Abstracts: see page 32

The Impact of Shukko (Employee Transfers) within Group Companies on the Capability and Speed of Promotion of Engineers

Hideki Shimizu-Tanaka, Yoshifumi Nakata
Doshisha University, Japan

Intrinsic Motivation and Creative Behavior: Moderating Role of Active Efforts

Sayaka Shinohara, Tetsushi Fujimoto, Hideki Shimizu-Tanaka, Yoshifumi Nakata
Doshisha University, Japan

Technology Transfer Portals: A Design Model for Supporting Technology Transfer via Social Software Solutions

Günther Schuh¹, Susanne Aghassi²
¹*RWTH Aachen University, Germany*
²*Fraunhofer Institute for Production Technology IPT, Germany*

Comparison of Indicators to Detect Emerging Researches using Time Transition in Quasicrystals

Shino Iwami¹, Junichiro Mori¹, Yuya Kajikawa², Ichiro Sakata¹
¹*The University of Tokyo, Japan*
²*Tokyo Institute of Technology, Japan*

Identity Management for the Requirements of the Information Security

Mirley Ferreira, Kelly Alonso
Fluminense Federal University, Brazil

Knowledge Management in the Chinese Local Beer Market: A Case Study

Jiageng Duan, Nachiappan Subramanian, Muhammad Abdulrahman
The University of Nottingham, China

OR 1 Operations Research (1)

12/11/2013 13:30 - 15:00
Room: Salon B

Chairs: Mohamed K. Omar
Amir Azaron

Abstracts: see page 33

Mathematical Modeling of Co2e Emissions in One-to-one Pickup and Delivery Problems

Emrah Demir, Tom Van Woensel
Technology University of Eindhoven, Netherlands

G/G/1 Models for a Single Machine under Different Types of Interruptions

Kan Wu¹, Ning Zhao²
¹*Georgia Tech, United States*
²*Kunming University of Science and Technology, China*

Improving Productivity of the SMEs in Singapore – Case Studies

Aloysious Lee, Roland Lim, Bin Ma, Laura Xiao Xia Xu
Singapore Institute of Manufacturing Technology, Singapore

A Note on Computing the Exact Probability Distribution of the Project Completion Time in a Stochastic PERT Network

Zdzisław Milián
Cracow University of Technology, Poland

A Bi-level Model for Resource-Constrained Multiple Project Scheduling Problems

Zhe Zhang¹, Yang Wang²
¹*Nanjing University of Science and Technology, China*
²*Sichuan University, China*

A Novel Multi-Objective Fuzzy Mathematical Model for Designing a Sustainable Supply Chain Network Considering Outsourcing Risk under Uncertainty

Firoozi Mehdi¹, Ali Siadat¹, Nima Salehi², S. M. Mousavi²
¹*Arts et Métier Paris Tech, France*
²*University of Tehran, Iran*

OR 2 Operations Research (2)

12/11/2013 15:30 - 17:30
Room: Salon B

Chairs: Kiyoshi Sawada
Ning Zhao

Abstracts: see page 34

An Improved Heuristic Algorithm for the Special Case of the Set Covering Problem
Amnon Gonen, Tzhi Avrahami, Uriel Israeli
HIT - Holon Institute of Technology, Israel

Efficiency Improvement in Explicit Enumeration for Integer Programming Problems
Shin-Guang Chen
Tungnan University, Taiwan

A New Methodology for Solving Multi-Objective Stochastic Optimization Problems with Independent Objective Functions
Saltuk Selcuklu¹, David Coit¹, Frank Felder¹, Mark Rodgers¹, Naruemon Wattanapongsakorn²
¹*Rutgers University, United States*
²*King Mongkut's University of Technology Thonburi, Thailand*

Optimal Pricing and Inventory Policy with Delayed Payments and Order Cancellations
Jie Zhang¹, Baozhuang Niu²
¹*Guangdong University of Finance and Economics, China*
²*Lingnan College, Sun Yat-sen University, China*

Optimal Scheduling Problem for Taiwan Post Office Counters and Manpower
Gwo-Liang Liao, Wen-Hsin Chiang
National Taitung University, Taiwan

Modeling and Solution of Practical Airline Crew Scheduling Problems
Yu Iijima¹, Tatsushi Nishi¹, Masahiro Inuiguchi¹, Satoru Takahashi², Kenji Ueda³, Keiji Ojima³
¹*Osaka University, Japan*
²*Mitsubishi Electric Corporation, Japan*
³*Mitsubishi Electric Information Systems Corporation, Japan*

HF 1 Human Factors (1)

12/11/2013 13:30 - 15:00
Room: Rachavadee

Chairs: Myung Hwan Yun
Kai-way Li

Abstracts: see page 35

Knowing What a User Likes: Mobiquitous Home with NFC Smartphone
Teh Pei-Lee¹, Ahmed Pervaiz Khalid¹, Soon-Nyeon Cheong², Alan H.S. Chan³, Wen-Jiun Yap²
¹*Monash University, Malaysia*
²*Multimedia University, Malaysia*
³*City University of Hong Kong, Hong Kong SAR*

Anthropometric Measures and Static Muscular Strengths for Youths Males and Females
Kai-Way Li, Chao-Cheng Su, Szu-Yin Huang
Chung Hua University, Taiwan

Relationship between Floor-type Gait Adaptations and Required Coefficient of Friction
Kai-Way Li, Szu Yin Huang, Chien Wen Wang
Chung Hua University, Taiwan

Subjective Rating of Floor Slipperiness & Slip/Fall Outcomes in a Gait Experiment
Kai-Way Li, Chien Wen Wang, Szu-Yin Huang
Chung Hua University, Taiwan

Quantification of Human Error Rate in Underground Coal Mines - A Fuzzy Mapping and Rough Set Based Approach
Suprakash Gupta, Pramod Kumar, Netai Chandra Karmakar, Sanjay Kumar Palei
Indian Institute of Technology (BHU), India

A Case Study Evaluating the Impact of Human Behavior on a Manufacturing Process In-line with Automatic Processes by Means of a Simulation Model
Ana Eduarda Sa Silva¹, Michael Donauer¹, Americo Azevedo¹, Paulo Peças², Elsa Henriques²
¹*University of Porto, Portugal*
²*Instituto Superior Técnico, Portugal*

DM 1 Decision Analysis & Methods (1)

12/11/2013 15:30 - 17:30
Room: Rachavadee

Chairs: Yves De Smet
Naragain Phumchusri

Abstracts: see page 36

Leadership Selection, Punishment Salience and Cooperation
Yanmei Li¹, Miao Chao²
¹*Chinese Academy of Sciences, China*
²*University of Chinese Academy of Sciences, China*

Efficiency and Productivity Growth of Technology-Based Firms in Business Incubators: A DEA and Malmquist Index Approach
José Santos, Antonio Grilo
Universidade Nova de Lisboa, Portugal

A Decision Analysis for the Dynamic Crop Rotation Model with Markov Process's Concept
Tyrone T. Lin, Chung-Hsiao Hsieh
National Dong Hua University, Taiwan

A New Version of 2-Tuple Fuzzy Linguistic Screening Evaluation Model in New Product Development
Wen-tao Guo, Van-Nam Huynh
Japan Advanced Institute of Science and Technology, Japan

The Position of Sustainable Corporate Social Responsibility in the Process of Creating Sustainable Prosperity in the European Union
Oliver Moravcik, Lubomir Smida, Peter Sakal
Slovak University of Technology, Slovakia (Slovak Republic)

Evaluating and Benchmarking Operational Performance of Manufacturing Facilities in Networks of Multinational Corporations
Alireza Tavakoli, Marco Biesen
Fraunhofer Institute for Material Flow and Logistics, Germany

SC 1 Supply Chain Management (1)

12/11/2013 13:30 - 15:00
Room: Ubonchard

Chairs: Gaurav Tejpal
Loganathan Ponnambalam

Abstracts: see page 37

Optimization of Forest Vehicle Routing Using Reactive Tabu Search Metaheuristic

Moussa Bagayoko¹, Thien-My Dao¹,
Bathelemy-Hugues Ateme-Nguema²
¹Ecole de technologie supérieure, Canada
²Université du Québec en
Abitibi-Témiscamingue (UQAT), Canada

An Inoperability Input-output Model (IIM) for Disruption Propagation Analysis

Chin Sheng Tan¹, Puay Siew Tan¹, Siang Guan Lee², Manh Tung Pham¹
¹Singapore Institute of Manufacturing Technology, Singapore
²Nanyang Technological University, Singapore

Improvement to the Freight Management of ITAR Controlled Items using Lean Six Sigma

Kin Meng Wong¹, Tony Halim², Yan Weng Tan¹
¹SIM University, Singapore
²Temasek Polytechnic, Singapore

Performance Measurement of a Dairy Supply Chain: A Balance Scorecard Perspective

Gyan Prakash¹, Rakesh Pant²
¹Indian Institute of Information Technology and Management Gwalior, India
²Aligarh Muslim University, India

Modeling Supply Risk using Belief Networks: A Process with Application to the Distribution of Medicine

Kanogkan Leerojanaprapa, Robert van der Meer, Lesley Walls
University of Strathclyde, United Kingdom

Social Media for Supply Chain Risk Management

Xiuju Fu, Rick Siow Mong Goh, Joo Chuan Tong, Loganathan Ponnambalam, Xiao Feng Yin, Zhaoxia Wang, Haiyan Xu, Sifei Lu
Institute of High Performance Computing, Singapore

SC 2 Supply Chain Management (2)

12/11/2013 15:30 - 17:30
Room: Ubonchard

Chairs: Jui-Sheng Chou
Regena Scott

Abstracts: see page 38

Time-phasing and Decoupling Points as Analytical Tools for Purchasing

Jenny Backstrand¹, Joakim Wikner²
¹Jonkoping University, Sweden
²Jonkoping University/Linköping University, Sweden

An Integration of AHP Approach and Bayes Classification Algorithm in Supplier Selection

Felix Chan, Nick Chung, Jenny Chow, Ben Niu
The Hong Kong Polytechnic University, Hong Kong SAR

Optimal Pricing and Returns Policies for Innovative Products with the One-Shot Decision Theory

X. Ma, Feijun Guo
Yokohama National University, Japan

Barriers to Green Supply Chain Implementation in the Electronics Industry

Sorraya Khiewnavawongsa¹, Edie Schmidt²
¹Chiang Mai University, Thailand
²Purdue University, United States

An EOQ Model with Consideration of Second-Trip In-Store Replenishment

Vatcharapol Sukhotu¹, Supachart Iamratanakul²
¹Asian Institute of Technology, Thailand
²Kasetsart University, Thailand

Prioritizing Lean Supply Chain Management Initiatives in Healthcare Service Operations: A Fuzzy-AHP Approach

Tritos Laosirihongthong¹, Premaratne Samaranyake², Dotun Adebajo³
¹Thammasat University, Thailand
²University of Western Sydney, Australia
³University of Greenwich, United Kingdom

SI 1 Service Innovation & Management (1)

12/11/2013 13:30 - 15:00
Room: Jamjuree

Chairs: Han Tong Loh
Alexandra Medina-Borja

Abstracts: see page 39

Service Performance Evaluation using Fuzzy Semantic Extraction of On-line Reviews

A. Medina-Borja, M. Carrasco
University of Puerto Rico at Mayaguez, Puerto Rico

Investigation of Team Composition and Task-related Conflict as Determinants of Engineering Service Productivity

Philipp M. Przybysz, Soenke Duckwitz, Susanne Mütze-Niewöhner, Christopher M. Schlick
RWTH Aachen University, Germany

The Service Science Practical Research of the BEST Model: The C telco's IPTV Service in Taiwan as the Example

Hung Chih Lai¹, Yao Cheng Yu², Kae Kuen Hu², Chien-Ming Tung²
¹Shih Chien University, Taiwan
²National Taiwan University, Taiwan

Influencing Factors on the Productivity of Knowledge-intensive Services

Robert Stranzenbach¹, Alexander Rannacher¹, Flavius Sturm², Susanne Mütze-Niewöhner¹
¹RWTH Aachen University, Germany
²University of Stuttgart, Germany

Design Driven Product-Service Innovation in Manufacturing

David Opresnik, Christian Zanetti, Marco Taisch
Politecnico di Milano, Italy

Service Performance Assessment and Governance

Marco Taisch¹, Mohammadreza Heydari Alamdari¹, Christian Zanetti¹, Margherita Peruzzini²
¹Politecnico di Milano, Italy
²Indesit Company, Italy

QC 1 Quality Control & Management (1)

12/11/2013 15:30 - 17:30
Room: Jamjuree

Chairs: Henrik Eriksson
Nachiappan Subramanian

Abstracts: see page 40

Detecting High Incidence by Using Variable Scan Radius

Chen-ju Lin, Yi-chun Shu
Yuan Ze University, Taiwan

Application of Six Sigma Methodology for a Manufacturing Cell- A Case Study

Vijaya Kumar, V Prashant, K N Subramanya, N S Narahari
R.V.College of Engineering, India

Prediction of Energy Consumption Indices in the Automotive Industry

Antonio Almeida¹, Americo Azevedo², Alvaro Caldas³
¹*INESC Porto / University of Porto, Portugal*
²*University of Porto, Portugal*
³*INESC Porto, Portugal*

A Mathematical Framework for Parameter Designing Under the Noise: A Case Study from a Conventional Turning Machine

R.M. Chandima Ratnayake
University of Stavanger, Norway

Who Needs to Learn What from Whom? Understanding Quality Management by Differentiating Organisations and Practices

Henrik Eriksson
Chalmers University of Technology, Sweden

A Conceptual Readiness Framework for Statistical Process Control (SPC) Deployment

Sarina Abdul Halim Lim, Jiju Antony
University of Strathclyde, United Kingdom

PP 1 Production Planning & Control (1)

12/11/2013 13:30 - 15:00
Room: Sakthong

Chairs: Suksan Prombanpong
Shijin Wang

Abstracts: see page 41

A Fuzzy-based Multi-Term Genetic Algorithm for Reentrant Flow Shop Scheduling Problem

I-Hsuan Huang, Shigeru Fujimura
Waseda University, Japan

The Effect of Metal Noise Factor to RFID Location System

Seng Fat Wong, Yi Zheng
University of Macau, Macau

Concept of an Intelligent Production Control for Global Manufacturing in Dynamic Environments Based on Rescheduling

Gisela Lanza, Nicole Stricker, Raphael Moser
Karlsruhe Institute of Technology, Germany

The Effectiveness Evaluation of Job-shop Scheduling based on Theory of Constraints (TOC) Under Demand Variation

Chompoonoot Kasemset, Uttapol Smutkupt, Nichchima Anongjanya
Chiang Mai University, Thailand

Task and Worker Assignment in the Shared-Machine U-Shaped Assembly Line

Pattarawan Khemyong, Ronnachai Sirovetnukul
Mahidol University, Thailand

Investigation of the Information Generated by Technology Management Tools and Links to Strategic Product Planning Stages

Alexander U. Reik, Moritz King, Udo Lindemann
Technische Universität München (TUM), Germany

SM 1 Systems Modeling & Simulation (1)

12/11/2013 15:30 - 17:30
Room: Sakthong

Chairs: Linda Zhang
Balkrishna Eknath Narkhedde

Abstracts: see page 42

Automatic Planning of GPON/FTTH Networks Based on Lagrangian Heuristic Optimization

Ling Cen¹, Kin Poon¹, Zhuliang Yu², Anis Ouali¹
¹*Etisalat British Telecom Innovation Centre, Khalifa University of Science, Technology And Research, United Arab Emirates*
²*South China University of Technology, China*

Concept for an Integration-framework to Enable the Crossdisciplinary Development of Product-service Systems

Konstantin Kernschmidt¹, Thomas Wolfenstetter¹, Christopher Münzberg¹, Daniel Kammerl¹, Suparna Goswami¹, Udo Lindemann², Helmut Krcmar¹, Birgit Vogel-Heuser¹
¹*Technische Universität München, Germany*
²*Technische Universität München (TUM), Germany*

Functional Analysis and Modeling of Complex, Evolutionary Grown, Mechatronic Products

Michael Roth¹, Daniel Kasperek¹, Udo Lindemann²
¹*Technische Universität München, Germany*
²*Technische Universität München (TUM), Germany*

Using DSM and MDM Methodologies to Analyze Structural SysML Models

Sebastian Maisenbacher, Konstantin Kernschmidt, Daniel Kasperek, Birgit Vogel-Heuser, Maik Maurer
Technische Universität München, Germany

Identifying Signs of Systems Fragility: A Crowdsourcing Requirements Case Study

Attila-Peter Toth, Davor Svetinovic
Masdar Institute of Science and Technology, United Arab Emirates

Determining Optimal Zone Boundaries for Three-Class-Based Puzzle-Based Compact Storage Systems

Linda Zhang¹, Yugang YU², Li Zhang²
¹*Catholic University of Lille, France*
²*The University of Science and Technology of China, China*

EE 1 Engineering Economy & Cost Analysis (1)

12/11/2013 13:30 - 15:00
Room: Patumchard

Chairs: Md. Mamun Habib

Abstracts: see page 43

The Cost and Benefit Analysis of Taiwan High Speed Railway - With Sustainable Perspectives

Hsiao-min Chuang¹, Chihpeng Chu²
¹Taiwan Hospitality & Tourism College, Taiwan
²National Dong Hwa University, Taiwan

Reducing Investment Costs in Multi-Variant Mass Production

Achim Kampker, Heiner Hans Heimes, Stefan Bickert, Timon Rodenhäuser
Laboratory for Machine Tools and Production Engineering (WZL), RWTH Aachen University, Germany

Considerations for Commoditization Factors in Flat-Screen TV Industry

Hirotohi Uehara¹, Yusuke Makino², Hiroyuki Nagano³, Keisuke Uenishi⁴, Shuichi Ishida⁵
¹Panasonic Corporation, Japan
²Chubu Electric Power Co., Inc, Japan
³University of Hyogo, Japan
⁴Osaka University, Japan
⁵Ritsumeikan University, Japan

A Parametric Cost Estimation Model to Develop Prototype of Electric Vehicle based on Activity-Based Costing

Rakhman Ardiansyah, Wahyudi Sutopo, Muhammad Nizam
Sebelas Maret University, Indonesia

Software Test Estimation Tools using Use Cases and Functions

Shaiful Islam, Bishwajit Banik Pathik, Manzur H. Khan, Md. Mamun Habib
American International University - Bangladesh (AIUB), Bangladesh

PM 1 Project Management (1)

12/11/2013 15:30 - 17:30
Room: Patumchard

Chairs: Leon Pretorius
Egon Mueller

Abstracts: see page 44

Optimal Scheduling of Work-Content-Constrained Projects

Philipp Baumann, Norbert Trautmann
University of Bern, Switzerland

Solving a New Mixed Integer Non-linear Programming Model of the Multi-Skilled Project Scheduling Problem Considering Learning and Forgetting Effect on the Employee Efficiency

Erfan Mehmanchi, Shahram Shadrokh
Sharif University of Technology, Iran

An Empirical Study of Critical Success Factors of Project Governance in China

Wenwen Xiang, Ying Li, Yongyi Shou
Zhejiang University, China

Elimination of Waste Through Value Add/Non Value Add Process Analysis To Improve Cost Productivity in Manufacturing - A Case Study

Kam-Choi Ng¹, Chun Pei Lim¹, Kuan Eng Chong², Gerald Guan Gan Goh³
¹Infineon Technologies, Malaysia
²Technical University Malaysia, Malaysia
³Multimedia University, Malaysia

Schedule Risk Analysis in Construction Project Using RFMEA and Bayesian Networks: the Cali-colombia Case Study

Camilo Andres Mican Rincon¹, Víctor Javier Jimenez¹, Jessica Perez², Alejandro Borrero³
¹Universidad del Valle, Colombia
²Vatia, Colombia
³Coomeva, Colombia

Fuzzy Decision Model for Construction Contractor's Selection in Egypt: Tender Phase

Hossam Hassaan, Nashaat Fors, Mostafa Shehata
University of Alexandria, Egypt

EB 1 E-Business & E-Commerce (1)

12/11/2013 13:30 - 15:00
Room: Satabud

Chairs: Michel Aldanondo
Antonio Grilo

Abstracts: see page 45

Internet Usage Trend and Postal Service Performance in Australia

Sung Shim¹, Arun Kumar², Hasan Hakami²
¹Seton Hall University, United States
²Royal Melbourne Institute of Technology (RMIT), Australia

Measuring the Performance of Viral Marketing based on the Dynamic Behavior of Social Networks

Atikhom Siri, Trasapong Thaiupathump
Chiang Mai University, Thailand

Mobile Stock Trading (MST) and its Social Impact: A Case Study in Hong Kong

Kin Meng Sam¹, Chris Chatwin², Iat Cheng Ma¹
¹University of Macau, China
²University of Sussex, United Kingdom

How Sense Qualities Influence User Preference of E-commerce Website

Dunxing Wang¹, Junxiu Zhang²
¹Tsinghua University, China
²Northeastern University, China

Research on Product Common Attribute Model with Consumption Value Theory Applied in Food industry

Tsung-Yi Chen¹, Yan-Chen Liu², Yuh-Min Chen²
¹Nanhua University, Taiwan
²National Cheng Kung University, Taiwan

Incorporating Location, Routing and Inventory Decisions in Dual Sales Channel - A Hybrid Genetic Approach

Chia-lin Hsieh¹, Shu-hsien Liao², Wei-chung Ho²
¹Aletheia University, Taiwan
²Tamkang University, Taiwan

RM 1 Reliability & Maintenance Engineering (1)

12/11/2013 15:30 - 17:30
Room: Satabud

Chairs: David Coit
Yoshinobu Tamura

Abstracts: see page 46

Product Support Logistics Based on System Reliability Characteristics and Operating Environment

Behzad Ghodrati, Alireza Ahmadi
Luleå University of Technology, Sweden

Reliability Analysis Based on Network Traffic for a Mobile Computing

Yoshinobu Tamura¹, Shigeru Yamada²
¹*Yamaguchi University, Japan*
²*Tottori University, Japan*

Interval Estimations of Software Reliability and Optimal Release Time Based on Better Bootstrap Confidence Intervals

Shinji Inoue, Shigeru Yamada
Tottori University, Japan

Production Reliability Evaluation of Continuum-State Manufacturing System Based on Universal Generating Function

Fen Kuang, Wei Dai, Yu Zhao
Beihang University, China

Multi-Response Surface Optimization Using Axiomatic Design

Vijay Rathod¹, Om Prakash Yadav², Ajay Pal Singh Rathore³
¹*Government Polytechnic Mumbai, India*
²*North Dakota State University, United States*
³*Malaviya National Institute of Technology, India*

Accelerated Life Tests for Data Acquisition Devices used in Smart Grids

Lijuan Shen¹, Xuan Liu¹, Zhi-Sheng Ye²
¹*China Electric Power Research Institute, China*
²*The Hong Kong Polytechnic University, Hong Kong SAR*

SR 1 Safety, Security & Risk Management (1)

12/11/2013 13:30 - 15:00
Room: Boontarik

Chairs: Paolo Trucco
Xiuzhu Gu

Abstracts: see page 47

Resilience of Transport Systems Under Disaster: Simulation-based Analysis of 2011 Tsunami in Japan

Paolo Trucco¹, Nobuaki Minato², Nicola Careri¹
¹*Politecnico di Milano, Italy*
²*Keio University, Japan*

A Study of Semiconductor Industry Accidents: Making Predictions Based on BP Artificial Neural Networks

Chao Liu, Hsuan Peichen, Wu Jianping
Semiconductor Manufacture International Corporation, China

Estimating Reporting Culture and Its Link to Safety Performance by Applying Hemodialysis Error Taxonomy

Xiuzhu Gu, Kenji Itoh
Tokyo Institute of Technology, Japan

Risk Profiling in Asymmetric Warfare through Intelligent Analysis of Images and Neural Networks

Prem K Kalra, Rajkumar Vishwakarma
Indian Institute of Technology Delhi, India

Merging Habitus into Safety Risk Management: A Case from the U.S. Construction Industry

Dong Zhao
Virginia Tech, United States

Relationship Between Working Postures and MSD in Different Body Regions Among Electronics Assembly Workers in Malaysia

Roseni Abdul Aziz¹, Mat Rebi Abdul Rani², Jafri Mohd Rohani², Ademola James Adeyemi², Nurlyana Omar¹
¹*National Institute of Occupational Safety and Health (NIOSH), Malaysia*
²*Universiti Teknologi Malaysia, Malaysia*

GM Global Manufacturing & Management

12/11/2013 15:30 - 17:30
Room: Boontarik

Chairs: Yan-Ru Li

Abstracts: see page 48

The Use of Improvement Tools: a Comparison Between Sectors and Industries

Dotun Adebajo¹, Matthew Tickle², Frank Ojadi³, Robin Mann⁴
¹*University of Greenwich, United Kingdom*
²*University of Liverpool, United Kingdom*
³*University of Lagos, Nigeria*
⁴*Massey University, New Zealand*

The Impact of Absorptive Capacity on Post-Acquisition Financial Performance: The European ICT Data

Mait Rungi, Valeria Stulova
Tallinn University of Technology, Estonia

Efficient Optimization Methods for Extended Flow Path Design

Julie Rubaszewski¹, Alice Yalaoui¹, Lionel Amodeo¹, Sylvain Fuchs²
¹*Universite de Technologie de Troyes, France*
²*ANDRA, France*

Motivations and Criteria for Partner Selection in Innovation Alliance

Xiao-li Chen, Ralph Riedel, Egon Mueller
Chemnitz University of Technology, Germany

Industry Clusters and Business Ecosystems- The Smart Mobile Industry in Taiwan

Yan-Ru Li, Wen-Zhe Yang
Aletheia University, Taiwan

Linkages Influencing NPD-SCM Alignment - Evidence from Indian Automotive Industry

Ankur Pareek¹, Ajay Pal Singh Rathore², Rakesh Jain²
¹*Government Engineering College, Ajmer, India*
²*Malaviya National Institute of Technology, India*

Poster Session 1

12/11/2013 15:00 - 15:30
Room: Krisana

- p.49 **Comparison of the Predetermined Time Systems MTM-1 and BasicMOST in Assembly Production**
Marek Bures¹, Pavlina Pivodova²
¹University of West Bohemia, Czech Republic
²Tomas Bata University, Czech Republic
- p.49 **Cyclic Production for Robotic Cells Served by Multi-function Robots with Resumable Processing Regime**
Mehdi Foumani, Yousef Ibrahim, Indra Gunawan
Monash University, Australia
- p.49 **Study on Design Change Review for Small and Medium-sized Enterprises**
Xiaonan Yu, Zhibing Yang, Guoxin Wang, Jiping Lu
Beijing Institute of Technology, China
- p.49 **Load Forecasting Assessment using SARIMA Model and Fuzzy Inductive Reasoning**
Nestor Gonzalez Cabrera¹, Guillermo Gutierrez², Esteban Gil³
¹Instituto Tecnológico Superior de Irapuato, Mexico
²Instituto Tecnológico de Morelia, Mexico
³Universidad Técnica Federico Santa Maria, Chile
- p.49 **The Evaluation Model for Cooperate Social Responsibility from a Management Flexibility Perspective**
Tyrone T. Lin, Tai-Chi Huang
National Dong Hwa University, Taiwan
- p.49 **A Green Logistics Evaluation Model with Real Options Approach**
Tyrone T. Lin, Yu-Shyuan Lu
National Dong Hwa University, Taiwan
- p.49 **A Study On The Statistical Comparison Methods for Engineering Applications**
Serena Ji, Randy Kang, Lisa Yu, Weiting Kary Chien
Semiconductor Manufacturing International Corporation, China
- p.49 **The Research of Online Shopping Evaluation Based on Grey Linguistic Multiple Criteria Decision Making System**
Zhifeng Li¹, Liyi Zhang²
¹Wuhan University, China
²Guangdong University of Finance and Economics, China
- p.49 **A Fuzzy Simulated Evolution Algorithm for Multi-Objective Homecare Worker Scheduling**
Michael Mutingi, Charles Mbohwa
University of Johannesburg, South Africa
- p.50 **Reliable Cooperative and Backup Covering in Disaster Situations**
Ladan Hazrati Ashtiani¹, Mehdi Seifbarghy¹, Mahdi Bashiri²
¹Alzahra University, Iran
²Shahed University, Iran
- p.50 **A Framework for the Choice of the Opportunistic Maintenance Policy in Industrial Contexts**
Mariagrazia Di Dio, Raffaele Iannone, Salvatore Miranda, Stefano Riemma
University of Salerno, Italy
- p.50 **Model-Following Controller Design based on a Stabilized Digital Inverse System**
Ryo Tanaka, Hiroki Shibasaki, Hiromitsu Ogawa, Takahiro Murakami, Yoshihisa Ishida
Meiji University, Japan
- p.50 **Simulation of Departure Terminal in Soekarno-Hatta International Airport**
Dimas Novrisal¹, Nuraida Wahyuni², Nadia Hamani², Abderrahman Elmhamedi³, Tresna Soemardi⁴
¹Université de Paris 8, France, University of Mercubuana, Indonesia
²Université de Picardie Jules Verne, France
³Université de Paris 8, France
⁴University of Indonesia, Indonesia
- p.50 **Enhanced Viability in Organizations: An Approach to Expanding the Requirements of the Viable System Model**
Fatos Elezi¹, Michael Schmidt¹, Iris Tommelein², Udo Lindemann¹
¹Technische Universität München, Germany
²University of California, United States
- p.50 **Deadlock Avoidance Policy for Dual-armed Multi-cluster Tools with Multi-flow**
Yushin Watanabe, Tatsushi Nishi
Osaka University, Japan
- p.50 **An Additive Manufacturing Resource Process Model for Product Family Design**
Ningrong Lei¹, Seung Ki Moon¹, Guijun Bi²
¹Nanyang Technological University, Singapore
²Singapore Institute of Manufacturing Technology, Singapore
- p.50 **Simulation of Supplier - Manufacturer Relationship Model for Securing Availability of Teak Log in Furniture Industry with Sustainability Consideration**
Dyah Nurrahmawati Eka Putri¹, Muhammad Hisjam¹, Wahyudi Sutopo¹, Kuncoro Harto Widodo²
¹Sebelas Maret University, Indonesia
²Gajah Mada University, Indonesia
- p.51 **Risk Sources and Their Influences on Consumers' Purchase Intention: A Research on Online Catering Group Buying**
Shao-Hua Wang¹, Yi Wen Chen², Xi Chen¹
¹Chinese Academy of Sciences, University of Chinese Academy of Science, China
²Chinese Academy of Sciences, China
- p.51 **Trade-In Concept for the Environment**
Romeo Manalo¹, Marivic Manalo²
¹Manila Electric Company, Philippines
²De La Salle University, Philippines
- p.51 **Innovation in Family-owned Food Companies in Japan**
Yasuaki Yamasaki¹, Kiminori Gemba²
¹Ritsumeikan University Graduate School of Technology Management, Japan
²Ritsumeikan University, Japan
- p.51 **A Study of Tourism Promotion Factors Affecting Tourists' Demand in Thailand**
Namtip Sakulngam, Sukree Sinthupinyo, Natcha Thawesaengskulthai, Supol Durongwatana
Chulalongkorn University, Thailand
- p.51 **The "Soft" Obstacles to Quality Excellence Practices: Evidence from the United Arab Emirates Industries**
Mehran Doulatabadi, Sha'ri Mohd Yusof, Farhad Nejadi
Universiti Teknologi Malaysia, Malaysia

TK 4 Technology & Knowledge Management (4)

12/12/2013 13:30 - 15:00
Room: Salon A

Chairs: Ville Ojanen
Foo Say Wei

Abstracts: see page 52

Perfect Interaction: Facilitating Evaluation of Collaborative Technologies for User Engagement in Engineering Innovation Networks

Roula Michaelides¹, Susan Morton²
¹The University of Liverpool, United Kingdom
²Loughborough University, United Kingdom

Universities Coping in the Changing Environment: Case LUT CST

Matti Karvonen, Vesa Karvonen, Jyri Vilko, Tuomo Kässi
Lappeenranta University of Technology, Finland

Drilling Waste Handling and Management in the High North

Yonas Zewdu Ayele, Abbas Barabadi, Javad Barabady
University of Tromsø, Norway

Forecasting the Success of Knowledge Management Adoption in Supply Chain

Sachin Patil, R. Kant
Sardar Vallabhbhai National Institute of Technology, India

Configuration of High Performance Apartment Buildings Renovation: A Constraint Based Approach

Elise Vareilles¹, Andrés Felipe Barco Santa², Marie Falcon³, Michel Aldanondo¹, Paul Gaborit¹
¹University of Toulouse, France, Metropolitan
²Pontificia Universidad Javeriana, Colombia
³TBC G n rateur d'Innovation, France

Product Data Management and Sheet Metal Features – Sheet Metal Part Recognition for an Easier Designing Process

Producing Manufacture-friendly Products
Merja Huhtala, Mika Lohtander, Juha Varis
Lappeenranta University of Technology, Finland

TK 5 Technology & Knowledge Management (5)

12/12/2013 15:30 - 17:30
Room: Salon A

Chairs: Dotun Adebajo
Pei-Lee Teh

Abstracts: see page 53

Commercialization of Early Stage University-based Inventions

Matti Karvonen¹, Rahul Kapoor¹, Ville Ojanen¹, Jussi Heinim  , Hannu Tervonen²
¹Lappeenranta University of Technology, Finland
²Technology Business Research Center, Finland

Research on Radical Innovation Design Process on the Stage of Fuzzy Front End by TRIZ

Enshun Ping, Runhua Tan, Jianguang Sun, Lizhen Jia
Hebei University of Technology, China

Patent Portfolio Analysis Using Citation Categories

Rahul Kapoor, Samira Ranaei, Matti Karvonen, Tuomo K ssi
Lappeenranta University of Technology, Finland

Agility of Capability Development: The Multiple-Case Study of Ericsson, Google, Microsoft and Nokia

Alar Kolk¹, Mait Rungi²
¹Aalto University, Finland
²Tallinn University of Technology, Estonia

Enhancing NPD Operational Performance Through B2B and B2C Customer Involvement for Varying Degrees of Product Technology

Dinush Wimalachandra, Bjoern Frank, Takao Enkawa
Tokyo Institute of Technology, Japan

Knowledge Capitalization and Synthesis for Integrated Circuit Manufacturing in Thailand

Suthep Butdee, Varavut Hirunyasiri
King Mongkut's University of Technology North Bangkok, Thailand

OR 3 Operations Research (3)

12/12/2013 13:30 - 15:00
Room: Salon B

Chairs: Ali Siadat
Shin-Guang Chen

Abstracts: see page 54

A Note on Dynamic Programming Formulations for Scheduling Job Classes with Changeover Times on a Single Machine

Eiji Mizutani
National Taiwan University of Science and Technology, Taiwan

Modeling Multi-stage Assembly Systems with Finite Capacity as a Queueing Network

Saeed Yaghoubi¹, Amir Azaron²
¹Iran University of Science and Technology, Iran
²Istanbul Sehir University, Turkey

Batching and Sequencing of Incompatible Job Families for a Single Machine Problem

Mohamed K. Omar¹, Yasothei Suppiah²
¹Nottingham University Business School, Malaysia
²Multimedia University, Malaysia

Complexity Analysis of the Discrete Sequential Search Problem with Group Activities

Kris Coolen, Roel Leus, Fabrice Talla Nobibon
KU Leuven, Belgium

The Development of Heuristic for Solving Multi Objective Mark Planning Problem in Garment Industry

Kritsada Puasakul, Paveena Chaovalitwongse
Chulalongkorn University, Thailand

Optimization Model for Part Nesting for Packing Problem

Mojahid Saeed Osman
King Fahd University of Petroleum and Minerals, Saudi Arabia

OR 4 Operations Research (4)

12/12/2013 15:30 - 17:30
Room: Salon B

Chairs: Amnon Gonen
Emrah Demir

Abstracts: see page 55

A Stochastic Programming Formulation to Minimize the Total Traveling Cost on the Northern Sea Route
Jinho Lee, Seongho Baek
Korea Naval Academy, South Korea

Restoration of Randomized Model Characteristics under Small Amounts of Data: Entropy-Robust Estimation
Yuri Popkov, Alexey Popkov
Institute for Systems Analysis, Russian Academy of Sciences, Russian Federation

A Model of Placing Liaisons in Multi-levels of an Organization Structure of a Complete Binary Tree Minimizing Total Distance
Kiyoshi Sawada
University of Marketing and Distribution Sciences, Japan

Sequential Testing of 3-level Deep Series-parallel Systems
Gurkan Işık, Tonguc Ünliuyurt
Sabancı University, Turkey

Influence of Cutting Parameters in Face Milling of Nodular Cast Iron Grade 500 Using Carbide Tool Affect the Surface Roughness and Tool Wear
Surasit Rawangwong, Worapong Boonchouytan, R. Burapa, J. Chatthong
Rajamangala University of Technology Srivijaya, Thailand

The Role of Purchasing Management Towards Sustainable Supply Chain: A Lifecycle Perspective
Kamonmarn Jaenglom, Zaheer Tariq
University of Bergamo, Italy

HF 2 Human Factors (2)

12/12/2013 09:00 - 10:30
Room: Rachavadee

Chairs: Shih-Miao Huang
Suprakash Gupta

Abstracts: see page 56

A Study of Affective Meanings Predicting Aesthetic Preferences of Interactive Skins
Shih-Miao Huang
National Formosa University, Taiwan

The Discussion of Machinery Manufacturing Industry Employees' Self-Efficacy, Organizational Learning and job Performance: The Example of Taichung Industrial Park
Tzou-Hwa Jiang, Shien-Liang Chen
Asia University, Taiwan

Comparison of AHP and Fuzzy AHP Methods for Human Resources in Science Technology (HRST) Performance Index Selection
Ying-Chyi Chou¹, Hsin-Yi Yen¹, Chia-Chi Sun², Jau-Shin Hon¹
¹Tunghai University, Taiwan
²Tamkang University, Taiwan

Generating a Research Keyword Structure using a Haptic Interaction using a Social Network Analysis Tool
Joobong Song¹, Ji Hyoun Lim², Sanghyun Kwon¹, Ilsun Rhiu¹, Byungki Jin¹, Sangoo Bahn³, Myung Hwan Yun¹
¹Seoul National University, South Korea
²Hongik University, South Korea
³Myongji University, South Korea

Emotional Mental Model
Constantin von Saucken, Ioanna Michailidou, Udo Lindemann
Technische Universität München, Germany

Preliminary Study on Systematic Literature Review of Vision Research
Y. L. Rhie¹, Ji Hyoun Lim², S. H. Ahn¹, G. W. Kim¹, Myung Hwan Yun¹
¹Seoul National University, South Korea
²Hongik University, South Korea

ET Engineering Education & Training

12/12/2013 11:00 - 12:30
Room: Rachavadee

Chairs: Arik Sadeh
Jan Harm Pretorius

Abstracts: see page 57

Triple Constraint Considerations in the Management of Construction Projects
Tshweu Mokoena, Jan Harm Pretorius, Jurie Van Wyngaard
University of Johannesburg, South Africa

From the Development of Robots to the Management of Organizations – a Discussion of the Integrative Approach of the Industrial Engineering Discipline
Sigal Koral-Kordova, Moti Frank, Arik Sadeh
Holon Institute of Technology, Israel

Knowledge Transfer Practices at Indian Premier Institute of Higher Learning in Technology
Kalyan Kumar Bhattacharjee, Ravi Shankar, M. P. Gupta
Indian Institute of Technology Delhi, India

The Impact of Teacher and Peer Communication on Adolescents' Learning Outcomes – Positive Perception Makes Better Performance
Jianhong Li¹, Gangyu Jin¹, Yi Wen Chen²
¹University of Chinese Academy of Sciences, China
²Chinese Academy of Sciences, China

Exploring the Required Personality Traits for Automotive Technician: A Human Resource Development Perspective
Hsiu-Te Sung, Han-Jau Niu
National Taiwan Normal University, Taiwan

Evaluation of a Restful Web Services Driven Three Dimensional E-learning Platform with Mashup for Ubiquitous and Personalized Learning
Chuan-Jun Su, P. T. Liu, Cheng Huang
Yuan Ze University, Taiwan

DM 2 Decision Analysis & Methods (2)

12/12/2013 13:30 - 15:00

Room: Rachavadee

Chairs: Usha Ananthakumar
Ralph Riedel

Abstracts: see page 58

Stochastic Total Cost of Ownership Forecasting for Innovative Urban Transport Systems

Dietmar Goehlich, Felix Spangenberg,
Alexander Kunith
Technical University of Berlin, Germany

Semiconductor Yield Loss' Causes Identification : A Data Mining Approach

Hasna Barkia, Xavier Boucher,
Rodolphe Le Riche, Philippe Beaune,
Marie-Agnès Girard, D. Rozier
Ecole Nationale Supérieure des Mines de Saint-Etienne, France

P2CLUST: an extension of PROMETHEE II for ordered clustering

Yves De Smet
Université Libre de Bruxelles, Belgium

Selection of Non-traditional Machining Processes: A Distance Based Approach

Tonmoy Choudhury¹, Partha Pratim Das¹, Manish Roy¹, Ishwar Shivakoti¹, Amitava Ray², B Pradhan¹
¹*Sikkim Manipal Institute of Technology, India*
²*National Institute of Technology, India*

Modeling Brain and Behavior of a Terrorist through Fuzzy logic and Ontology

Rajkumar Vishwakarma, R. Shankar
Indian Institute of Technology Delhi, India

Vehicle Scheduling Problem: A Comparative Study between Light Truck and Motorcycle in Small Patisserie Network

Chivalai Temiyasathit, Phathinan Thaitatkul
King Mongkut's Institute of Technology Ladkrabang, Thailand

DM 3 Decision Analysis & Methods (3)

12/12/2013 15:30 - 17:30

Room: Rachavadee

Chairs: Frank Felder
Zhe Zhang

Abstracts: see page 59

Application of Extreme Value Theory in Commodity Markets

Usha Ananthakumar¹, Ashwin Durga²
¹*Indian Institute of Technology Bombay, India*
²*Pricewaterhouse Coopers, India*

Change Propagation Analysis for Sustainability in Product Design

Sam Yeon Kim¹, Seung Ki Moon¹,
Hyung Sool Oh², Taezoon Park³,
Gyouhyung Kyung⁴, Kyoung Jong Park⁵
¹*Nanyang Technological University, Singapore*
²*Kangwon National University, South Korea*
³*Soongsil University, South Korea*
⁴*Ulsan National Institute of Science & Technology, South Korea*
⁵*Gwangju University, South Korea*

Equilibrium Strategy of a Processor-Sharing System with Discriminatory Discipline

Ying Shi, Zhaotong Lian
University of Macau, China

Weighted Additive Fuzzy Goal Programming-based Decision Support System for Green Supply Network Design

Kanda Boonsothonsatit, Sami Kara,
Berman Kayis, Suphunnika Ibbotson
The University of New South Wales, Australia

Multiple Criteria Model for Evaluation and Selection of Outsourcing Service Countries: A Case Study in the East and Southeast Asia

James K. C. Chen, Van Kien Pham,
Chih-Sung Chang, Thi Le Huyen
Nguyen
Asia University, Taiwan

Hotel Classification Visualization Using Natural Language Processing of User Reviews

Takayuki Suzuki, Kiminori Gemba,
Atsushi Aoyama
Ritsumeikan University, Japan

SC 3 Supply Chain Management (3)

12/12/2013 09:00 - 10:30

Room: Ubonchard

Chairs: Gyan Prakash
Edie Schmidt

Abstracts: see page 60

Pricing Strategy of Closed-loop Supply Chain Based on Premium and Penalty Mechanism

Juhong Gao, Wang Haiyan, Han
Hongshuai, Hou Liting
Tianjin University, China

3-Echelon Distribution Policy with Order Flexibility and Direct Ordering System

Yosi Agustina Hidayat, Lucia Diawati,
Yudi Thaddeus, Seto Sumargo
Bandung Institute of Technology (ITB), Indonesia

Supply Chain Management: Workforce Education

Regena Scott, Edith Schmidt
Purdue University, United States

Experiences from an NSF I/UCRC on Engineering Logistics and Distribution

Babur Pulat, Thomas Landers, Pakize
Pulat, Cengiz Altan, Zahed Siddique
University of Oklahoma, United States

Factor Analysis of Rational Trust among Supply Chain Partners in Indian Industries

Gaurav Tejpal¹, Rajiv Kumar Garg²,
Anish Sachdeva²
¹*Amritsar College of Engineering & Technology, India*
²*Dr B.R. Ambedkar National Institute of Technology, India*

Designing Supply Chain Analysis Tool Using SCOR Model (Case Study in Palm Oil Refinery)

Fitra Lestari¹, Kamariah Ismail¹, Abu
Bakar Abdul Hamid¹, Wahyudi Sutopo²
¹*Universiti Teknologi Malaysia, Malaysia*
²*Sebelas Maret University, Indonesia*

SC 4 Supply Chain Management (4)

12/12/2013 11:00 - 12:30
Room: Ubonchard

Chairs: Lesley Walls
Premaratne Samaranyake

Abstracts: see page 61

Demand Information Sharing Impact on Supply Chain Management under Demand Uncertainty. A Simulation Model

Ana Paula Barroso, Virginia Machado, Virgilio Cruz-Machado
Faculdade de Ciências e Tecnologia, FCT, Universidade Nova de Lisboa, Portugal

Models for the Optimization of Supply Chains - A Literature Review

Florian G. H Behncke¹, Julia Ehrhardt¹, Udo Lindemann²
¹*Technische Universität München, Germany*
²*Technische Universität München (TUM), Germany*

Modeling and Optimization of Inventory and Sourcing Decisions with Risk Assessment in Perishable Food Supply Chains

Zheng Ren, Arjaree Saengsathien, David Zhang
University of Exeter, United Kingdom

Developing a Two-echelon Inventory Model with Simultaneous Consideration of Backorders and Lost Sales

S. Kamal Chaharsoghi, Hassan Yadegari
Tarbiat Modares University, Iran

Decision Trees to Model the Impact of Disruption and Recovery in Supply Chain Networks

Loganathan Ponnambalam¹, Leow Wenbin², Xiuju Fu¹, Xiao Feng Yin¹, Zhaoxia Wang¹, Rick Siow Mong Goh¹
¹*Institute of High Performance Computing, Singapore*
²*National University of Singapore, Singapore*

Research on the Formation of Supply Chain Carbon Emission Reduction Union Based on Voluntary Emission Reduction

Yan Peng, Zhuoran Shi
Tianjin University, China

SC 5 Supply Chain Management (5)

12/12/2013 13:30 - 15:00
Room: Ubonchard

Chairs: Tony Halim
Jenny Backstrand

Abstracts: see page 62

Using Fuzzy Inference Systems to Improve Purchasing Process-Related Decisions

Javier Puente, Isabel Fernandez, Nazario Garcia, Paolo Priore
University of Oviedo, Spain

A Comparison of Forecasting Models using Multiple Regression and Artificial Neural Networks for the Supply and Demand of Thai Ethanol

Rojanee Homchalee, Weerapat Sessomboon
Khon Kaen University, Thailand

Reliability-based Decision Analysis for Ready Mixed Concrete Supply Chain Using Stochastic Method

Jui-Sheng Chou, Citra Ongkowiyo
National Taiwan University of Science and Technology, Taiwan

A Review of Data Development Analysis (DEA) Applications in Supply Chain Management Research

Woramol Chaowarat¹, Pairach Piboonrugroj², Jianming Shi³
¹*Muroran Institute of Technology, Japan*
²*Chiang Mai University, Thailand*
³*Tokyo University of Science, Japan*

3PL Selection: A Multi-criteria Decision Making Approach

Ankit Bansal, Pravin Kumar, Siddhant Issar
Delhi Technological University, India

A Bilevel Model for Transportation Service Sharing in Supply Hub in Industrial Park (SHIP)

Xuan Qiu, Gangyan Xu, George Huang
The University of Hong Kong, Hong Kong SAR

SC 6 Supply Chain Management (6)

12/12/2013 15:30 - 17:30
Room: Ubonchard

Chairs: Supachart Iamratanakul

Abstracts: see page 63

A Hierarchical Demand-driven Production Planning and Control Framework for the FMCG Industry: An SAP-based Approach

Poorya Farahani¹, Renzo Akkerman², Joerg Wilke¹
¹*SAP Deutschland AG & Co. KG., Germany*
²*Technische Universität München, Germany*

The Merging of MPS and Order Acceptance in a Semi-Order-Driven Industry: A Case Study of the Parasol Industry

Watcharee Wattanapornprom, Tieke Li
University of Science and Technology Beijing, China

Information Security Risk Assessment in SCM

Arup Roy¹, A D Gupta¹, S.G. Deshmukh²
¹*Indian Institute of Technology Delhi, India*
²*ABV Indian Institute of Information Technology & Management, India*

On Development of Supplier Segmentation Ontology Using Latent Semantic Analysis for Supplier Knowledge

Management in Supply Chain
Anirban Kundu, Vipul Jain
Indian Institute of Technology Delhi, India

Remanufacturing Intermittent Demand Forecast: A Critical Assessment

Prerna Mishra¹, Xue-Ming Yuan², Guangbin Huang¹, Laura Xiao Xia Xu²
¹*Nanyang Technological University, Singapore*
²*Singapore Institute of Manufacturing Technology, Singapore*

Sustainable Logistics Systems: A Framework and Case Study

Sooksiri Wichaisri, A. Sopadang
Chiang Mai University, Thailand

QC 2 Quality Control & Management (2)

12/12/2013 09:00 - 10:30
Room: Jamjuree

Chairs: Chen-ju Lin
Ayon Chakraborty

Abstracts: see page 64

Use of Engineering Robust Design Approach to Improve the Surface Quality of Pre-cast Concrete Elements: An Experimental Approach
Samindi Samarakoon, R.M. Chandima Ratnayake
University of Stavanger, Norway

Reducing Defects and Achieving Business Profitability using Innovative and Lean Thinking
Amol Lanke, Behzad Ghodrati
Luleå University of Technology, Sweden

A Computational Geometric Approach For A Novel Multivariate Process Capability Index
Birajashis Pattnaik¹, Sushanta Tripathy²
¹*Chandigarh Engineering College, India*
²*Kalinga Institute of Industrial Technology, India*

Assessing SMEs Batik Readiness for SNI Adoption (Case Study SMEs Solo and Yogyakarta)
Aries Susanty, Dyah Ika Rinawati, Bambang Purwanggono, Diana Puspitasari, Meylani
University of Diponegoro, Indonesia

PHM for Complex Mining and Metallurgy Equipment Multi-state System Based Optimal Multivariate Bayesian Model
Jianjun Wu, Shilang Wu, Xiongxiang You
Jiangxi University of Science and Technology, China

Composite Practices to Improve Sustainability: A Framework and Evidence from Chinese Auto-parts Industry
Zhen Wang, Nachiappan Subramanian, Muhammad Abdulrahman, Chang Liu
The University of Nottingham, China

HS 1 Healthcare Systems & Management (1)

12/12/2013 11:00 - 12:30
Room: Jamjuree

Chairs: Jose Machado

Abstracts: see page 65

Stand-Alone Electronic Health Record
Julio Duarte¹, Gabriel Pontes², Maria Salazar³, Manuel Santos¹, Antonio Abelha¹, Jose Machado¹
¹*University of Minho, Portugal*
²*Association of Municipalities of Vale do Ave, Portugal*
³*Centro Hospitalar do Porto, Portugal*

Analysis of Cross-Platform Development Frameworks for a Smartphone Pediatric Application
Rui Oliveira¹, Gabriel Pontes², Jose Machado¹, Antonio Abelha¹
¹*University of Minho, Portugal*
²*Association of Municipalities of Vale do Ave, Portugal*

Quality Improvement of General Out-patient Clinics in Hong Kong
C. M. Chan, T. C. Wong
City University of Hong Kong, Hong Kong SAR

Resource Allocation in Healthcare: Implications of Scarce Resources and Temporal Constraints
Juha Puustjärvi¹, Leena Puustjärvi²
¹*University of Helsinki, Finland*
²*The Pharmacy of Kaivopuisto, Finland*

Relationship between Polymeric Foam Characteristics and Properties of Porous Bone Substitute Fabricated by Polymeric Foam Replication
Wassanai Wattanutchariya
Chiang Mai University, Thailand

A Fuzzy Particle Swarm Optimization Approach for Task Assignment in Home Health Care
Michael Mutingi, Charles Mbohwa
University of Johannesburg, South Africa

HS 2 Healthcare Systems & Management (2)

12/12/2013 13:30 - 15:00
Room: Jamjuree

Chairs: Juha Puustjarvi

Abstracts: see page 66

Extending a Patient Monitoring System with Identification and Localisation
Fernando Marins, Rui Rodrigues, Carlos Filipe Portela, Manuel Santos, Antonio Abelha, Jose Machado
University of Minho, Portugal

Integrating RFID with Blood Supply Chain: A Technical and Business Analysis
Wei Xu¹, Zhaotong Lian¹, Xifan Yao²
¹*University of Macau, China*
²*South China University of Technology, China*

An Intelligent Approach for Open Clinical Laboratory Results in Intensive Care Medicine
Carlos Filipe Portela¹, Manuel Santos¹, Jose Machado¹, Antonio Abelha¹, Alvaro Silva², Fernando Rua²
¹*University of Minho, Portugal*
²*Centro Hospitalar do Porto, Portugal*

KIDEA : An Innovative Computer Technology To Improve Skills In Children With Intellectual Disability Using Kinect Sensor
Warih Puspitasari Soesatyo, Kholifatul Ummah, Ainu Pambudi
Telkom University, Indonesia

A Risk-adjusted Multi-attribute Cumulative Sum Control Scheme in Health-care Systems
Sayyedeh Nastaran Shojaei, S. T. A. Niaki
Sharif University of Technology, Iran

Home Healthcare Staff Scheduling: A Taxonomic State-of-the-Art Review
Michael Mutingi, Charles Mbohwa
University of Johannesburg, South Africa

SI 2 Service Innovation & Management (2)

12/12/2013 15:30 - 17:30

Room: Jamjuree

Chairs: Ching-Yu Lien
Marivic Manalo

Abstracts: see page 67

Adopt-A-Community Framework

Romeo Manalo¹, Marivic Manalo²
¹Manila Electric Company, Philippines
²De La Salle University, Philippines

Process Improvement – A Positive Deviance Approach

Ayon Chakraborty
James Cook University, Singapore

The Conceptual Model of Negative Experiences Regarding the Facilities at Family Trip Destinations - A Case Study of Tourism Factories

Hsin-Yen Wu¹, Ching-Yu Lien²
¹Yu Da University, Taiwan
²Minghsin University of Science and Technology, Taiwan

Dynamic Pricing in Performance Theater Industry: An Empirical Study

Naragain Phumchusri
Chulalongkorn University, Thailand

Quantifying the Service Level and Manpower Needs of Food Courts in Singapore

Wing Tai Chung¹, Xin Zhong¹, Han Tong Loh²
¹National University of Singapore, Singapore
²Singapore Institute of Technology, Singapore

IMU-WPS Hybrid Position Estimation Test-Bed Development

Byoung-seop Kim¹, Suk-yon Kang², Jae-hoon Kim¹
¹Ajou University, South Korea
²Network Technology R&D Center, SK Telecom, South Korea

SM 2 Systems Modeling & Simulation (2)

12/12/2013 09:00 - 10:30

Room: Sakthong

Chairs: Kun-Ming Yu
Ling Cen

Abstracts: see page 68

Detecting Hierarchical Community Structures in Social Networks Using Integer Linear Programming

Chun-Cheng Lin¹, Jia-Rong Kang¹, Jyun-Yu Chen¹, Chien-Liang Chen²
¹National Chiao Tung University, Taiwan
²Aletheia University, Taiwan

Simulation Modeling Analysis to Support Decision Making of Cassava Harvesting in Thailand

Warut Pannakkong¹, Jirachai Buddhakulsomsiri¹, Parthana Parthanadee²
¹Sirindhorn International Institute of Technology, Thammasat University, Thailand
²Kasetsart University, Thailand

Development of an Assessment Procedure for the Problem-Specific Selection of Most Suitable Modeling Methods for Complex Systems

Daniel Kasperek, Konrad Peters, Sebastian Maisenbacher, Maik Maurer
Technische Universität München, Germany

Optimum Design and Analysis of Riser for Sand Casting

Chandrashekar Choudhari¹, Balkrishna Eknath Narkhede¹, S K Mahajan²
¹Veermata Jijabai Technological Institute (VJTI), India
²Directorate of Technical Education, Maharashtra State, India

A SIS Epidemic Model with Impulsive Vaccination

Manuel de la Sen¹, Santiago Alonso-Quesada¹, Asier Ibeas²
¹University of Basque Country, Spain
²Autonomous University of Barcelona, Spain

Representing Ontologies in Multiple Domain Matrices

Daniel Kasperek, Ragna Steenweg, Sebastian Maisenbacher, Kathrin Jasmin Füller, Helmut Krcmar, Maik Maurer
Technische Universität München, Germany

QC 3 Quality Control & Management (3)

12/12/2013 11:00 - 12:30

Room: Sakthong

Chairs: Jianjun Wu
Shinji Inoue

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A New Method for Metrology Monitor Charts

Jinyi Ma, Kaily Cao, Weiting Kary Chien
Semiconductor Manufacturing International Corporation, China

Critical Practices in TQM Human Resources Development

Masayoshi Ushikubo¹, Hisato Tashiro², Nobuzumi Fujii¹, Kazuya Nakajima¹, Ichiro Sakata²
¹Sanden Corporation, Japan
²The University of Tokyo, Japan

An Enhancement for Single Sampling Plan Method

Randy Kang, Lisa Yu, Weiting Kary Chien
Semiconductor Manufacturing International Corporation, China

The Quality Control Application for Abnormal Raw Material Early Detection

Violet Shangguan, July Shui, Kevin Chang
Semiconductor Manufacturing International Corporation, China

Total Productive Maintenance Strategy in a Semiconductor Manufacturer: A Case Study

Kam-Choi Ng¹, Kuan Eng Chong², Gerald Guan Gan Goh³
¹Infineon Technologies, Malaysia
²Technical University Malaysia, Malaysia
³Multimedia University, Malaysia

Quality Control of Subcontractor Management in Wafer Foundry

Wenwen He, Kelly Yang
Semiconductor Manufacturing International (Shanghai) Corp., China

PP 2 Production Planning & Control (2)

12/12/2013 13:30 - 15:00
Room: Sakthong

Chairs: Tatsushi Nishi
Yuan Huang

Abstracts: see page 70

Operational Control of Service Processes: Empirical Evidence from the Financial Sector in Australia

Michael Leyer¹, Richard Willis², Ayon Chakraborty³, Jürgen Moormann¹
¹Frankfurt School of Finance & Management, Germany
²Queensland University of Technology, Australia
³James Cook University, Singapore

Quantifying the Impact of Using Multi-function Robots on Productivity of Rotationally Arranged Robotic Cells

Mehdi Foumani, Yousef Ibrahim, Indra Gunawan
Monash University, Australia

Analysis of the Effects of Flexibilities on Scheduling A Flexible Manufacturing System Using Discrete-Event Simulation

O. A. Joseph¹, R Sridharan²
¹College of Engineering Vadakara, India
²National Institute of Technology Calicut, India

A State-of-the-Art Workload Control System for Customized Industry

Yuan Huang
University of Southampton, United Kingdom

Requirement Derivation for the Factory Planning in the Automobile Industry through Strategic Scenario Generation

Egon Mueller¹, Mario Münnich², Jens Kellerbach², Siegfried Fiebig²
¹Chemnitz University of Technology, Germany
²Volkswagen AG, Germany

An Integrated Production Planning and Order Acceptance Model with Flexible Due Dates

Tarik Aouam¹, Nadjib Brahimi²
¹American University of Sharjah, United Arab Emirates
²University of Sharjah, United Arab Emirates

PP 3 Production Planning & Control (3)

12/12/2013 15:30 - 17:30
Room: Sakthong

Chairs: Seng Fat Wong
Michael Leyer

Abstracts: see page 71

A Mathematical Model on an Economic Lot Scheduling Problem with Shifting Process and Joint Material Replenishment

Dah-Chuan Gong¹, Jhin-Yong Lin¹, Gary C. Lin², Wen-Na Ma³
¹Chung Yuan Christian University, Taiwan
²Bradley University, United States
³Shih Chien University, Taiwan

Parallel-machine Scheduling with General Positional Deterioration and Maintenance

Shijin Wang
Tongji University, China

Critical Mapping of Sustainable Index Methodologies

Marco Taisch, Jing Shao
Politecnico di Milano, Italy

Lagrangian Relax and Fix Heuristics for Integrated Production Planning and Warehouse Layout Problem

Keisuke Ohga¹, Tatsushi Nishi¹, Guoqing Zhang², Sarina Turner³
¹Osaka University, Japan
²University of Windsor, Canada
³University of Toronto, Canada

The Production Planning of Pharmaceutical Production Under Multi Variables.

Suleeporn Chaolaem¹, Tuanjai Somboonwivat², Suksan Prombanpong²
¹Government Pharmaceutical Organization, Thailand
²King Mongkut's University of Technology Thonburi (KMUTT), Thailand

Improving The Efficiency of Ordering Policy: An Application In a Class-A Spare Part

Chivalai Temiyasathit, Natthanun Jangsethagul
King Mongkut's Institute of Technology Ladkrabang, Thailand

PM 2 Project Management (2)

12/12/2013 09:00 - 10:30
Room: Patumchard

Chairs: Norbert Trautmann
Pawel Blaszczyk

Abstracts: see page 72

Matrices-based Modeling of Communication within Planning Projects

Bernd Petraus, Roman Arnold, Ralph Riedel, Egon Mueller
Chemnitz University of Technology, Germany

The Identification of Limiting and Enabling Factors of the Organization on the Development of Platform-based Products

Wolfgang Bauer¹, Fatos Elezi¹, Florian Homann², Maik Maurer¹
¹Technische Universität München, Germany
²University of St. Gallen, Switzerland

Activity-based Process Model for Customer-driven Product Development

Anita Friis Sommer, Iskra Dukovska-Popovska, Kenn Steger-Jensen
Aalborg University, Denmark

Deliberating the Triple Constraint Trade-offs as Polarities to Manage – a Refreshed Perspective

C. Jurie Van Wyngaard¹, Jan Harm Pretorius², Leon Pretorius³
¹Employee Saab Grintek Defence, South Africa
²University of Johannesburg, South Africa
³University of Pretoria, South Africa

Construction of Ecological Niche Model of Projects under Management by Project Pattern in Enterprise

Kexin Huang
Northwestern Polytechnical University, China

Scrum Integration in Stage-gate Models for Collaborative Product Development - A Case Study of Three Industrial Manufacturers

Anita Friis Sommer¹, Andreas Slavensky², Vivi Thuy Nguyen¹, Kenn Steger-Jensen¹, Iskra Dukovska-Popovska¹
¹Aalborg University, Denmark
²AN-Group A/S, Denmark

EE 2 Engineering Economy & Cost Analysis (2)

12/12/2013 11:00 - 12:30
Room: Patumchard

Chairs: Hsiao-min Chuang
Michael Gepp

Abstracts: see page 73

Functional Assessment for Large-scale Wind-hydrogen Energy Integration Electricity Supply System in Taiwan

Pao-Long Chang, Chiung-Wen Hsu, Chih-Min Hsiung
Feng Chia University, Taiwan

Model for Integrated Value Engineering

Sebastian Maisenbacher, Florian G. H Behncke, Udo Lindemann
Technische Universität München, Germany

Revenue and Utility Maximization under Centralized Dynamic Spectrum Allocation

Hailing Zhu¹, Andre L Nel¹, Mbuyu Sumbwanyambe¹, Ling Cheng²
¹*University of Johannesburg, South Africa*
²*University of the Witwatersrand, South Africa*

Challenges of Performance Assessments for Engineering Departments: Empirical Study and Further Results

Michael Gepp¹, Michael Amberg¹, Stefan Horn², Thomas Schaeffler²
¹*University Erlangen-Nuremberg, Germany*
²*Siemens AG, Germany*

The Optimization of Maintenance Time and Total Site Crew for Base Transceiver Station (BTS) Maintenance Using Reliability Centered Maintenance (RCM) and Life Cycle Cost (LCC)

Rohmat Saedudin, Rino Andias Anugraha, Rachmad Eka
Telkom Institute of Technology, Indonesia

IP Information Processing & Engineering

12/12/2013 13:30 - 15:00
Room: Patumchard

Chairs: Antonio Grilo
Xu Zhang

Abstracts: see page 74

Scalable Clustering with Adaptive Instance Sampling

JaeKyung Yang¹, Byoungjin Yu², Myoungjin Choi³
¹*Chonbuk National University, South Korea*
²*R&D Center, Miracom, INC., South Korea*
³*Howon University, South Korea*

Integrated Information Modeling of Engineering Digital Prototyping for Satellite Design

Xu Zhang¹, Kai Wang¹, Haoqi Wang¹, Zheng Xie²
¹*Beijing Institute of Technology, China*
²*China Academy of Space Technology, China*

About the Power Transfer in Linear Time-Varying Circuits

Manuel de la Sen¹, Santiago Alonso-Quesada¹, Aitor Garrido¹, Asier Ibeas²
¹*University of Basque Country, Spain*
²*Autonomous University of Barcelona, Spain*

A Methodology for Designing an Interoperable Industrial Ecosystems, using the Axiomatic Design Theory

Izunildo Cabral, Pedro Espadinha-Cruz, Antonio Grilo, Antonio Gonçalves-Coelho, Antonio Mourao
Universidade Nova de Lisboa, Portugal

An Approach of Generative Design System: Jewelry Design Application

Somlak Wannarumon Kiarova¹, Prapasson Pradujphongphet¹, Erik Bohez²
¹*Naresuan University, Thailand*
²*Asian Institute of Technology, Thailand*

An Algorithmic Frame of Hybrid Position Estimation for a Mobile Handset

Hyun Min Jeon¹, Suk-Yon Kang², Jae-hoon Kim³
¹*Ajou University, South Korea*
²*Network Technology R&D Center, South Korea*
³*Industrial Engineering, South Korea*

FP Facilities Planning & Management

12/12/2013 15:30 - 17:30
Room: Patumchard

Chairs: Carman Ka Man Lee

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Minimizing Port Staying Time for Container Terminal with Position Based Handling Time

Helen Ma, Felix Chan, Nick Chung, Ben Niu
The Hong Kong Polytechnic University, Hong Kong SAR

Creation of FCEV Market: A New Approach to the Emerging Economy of Self-sustainability

Takuya Hasegawa¹, Hitoshi Igarashi¹, Kiminori Gemba²
¹*Nissan Motor Co. Ltd, Japan*
²*Ritsumeikan University, Japan*

Optimization of Facility Location Problem in Reverse Logistics Network using Artificial Bee Colony Algorithm

Shu Zhu Zhang, Carman Ka Man Lee
The Hong Kong Polytechnic University, Hong Kong SAR

Bat Algorithm for Designing Cell Formation with a Consideration of Routing Flexibility

Wipada Parika, Wipada Seesuasom, Srisatja Vitayasak, Pupong Pongcharoen
Naresuan University, Thailand

A Two-Stage Mathematical Model for Cross-Docking Distribution Planning Solved by a Two-Stage Heuristic Algorithm

S. M. Mousavi¹, Ali Siadat², Reza Tavakkoli-Moghaddam¹, Behnam Vahdani¹
¹*University of Tehran, Iran*
²*Arts et Métier Paris Tech, France*

Prediction on the Energy Or Power Structure Under the Constraint of Saving Energy and Carbon Emissions

Tuo Chen Li, Lin Qiao
Harbin Engineering University, China

EB 2 E-Business & E-Commerce (2)

12/12/2013 09:00 - 10:30
Room: Satabud

Chairs: Yi-Hui Liang
Nila Armelia Windasari

Abstracts: see page 76

Optimizing Concurrent Configuration and Planning: A Proposition to Reduce Computation Time

Paul Pitiot¹, Michel Aldanondo², Elise Vareilles², Thierry Coudert³, Linda Zhang⁴

¹Universite Toulouse - Mines Albi, France, Metropolitan

²University of Toulouse, France, Metropolitan

³Universite Toulouse INP-ENIT, France, Metropolitan

⁴Catholic University of Lille, France

DYNAMOD: A Modelling Framework for Digital Businesses based on Agent Based Modeling

Aneesh Zutshi, Antonio Grilo, Ricardo Jardim-Goncalves
Universidade Nova de Lisboa, Portugal

Performance Management for Inter-organization Information Systems performance: Using the Balanced Scorecard and the Fuzzy Analytic Hierarchy Process

Yi-Hui Liang
I-Shou University, Taiwan

Exploring E-readiness on E-commerce Adoption of SMEs: Case Study South-East Asia

James K. C. Chen, Nila Armelia Windasari, Pai Rose
Asia University, Taiwan

The Construction of Service Innovation of Green Bed and Breakfast (B&B)

Tain-Fung Wu, Ming-Yu Yang, Shien-Liang Chen
Asia University, Taiwan

Sourcing under Incomplete Information about Suppliers

Jishnu Hazra, B Mahadevan
Indian Institute of Management Bangalore, India

RM 2 Reliability & Maintenance Engineering (2)

12/12/2013 11:00 - 12:30
Room: Satabud

Chairs: Behzad Ghodrati
David Valis

Abstracts: see page 77

Dynamic k-out-of-n System with Component Partnership Design with Two Dependent Competing Failure Processes

Nida Chatwattanasiri¹, David Coit¹, Naruemon Wattanapongsakorn², Qianmei Feng³
¹Rutgers University, United States
²King Mongkut's University of Technology Thonburi, Thailand
³University of Houston, United States

Remaining Useful Life Prediction for a Hidden Wiener Process with an Adaptive Drift

Zeyi Huang, Zhengguo Xu
Zhejiang University, China

Reliability Analysis of Condition Monitoring Data on Aging Plants: A Case Study From Topside Static Mechanical Systems

R.M. Chandima Ratnayake, Mayang Kusumawardhani
University of Stavanger, Norway

Human Reliability and Workload in Product Design with different Frequencies of Interruption

Raymond Djalois, Soenke Duckwitz, Malte Hinsch, Joerg Feldhusen, Christopher M. Schlick
RWTH Aachen University, Germany

Maintenance-based Warranty for Offshore Wind Turbines

Yiliu Liu, Lijuan Dai
Norwegian University of Science and Technology, Norway

Prediction of Further Operation Based on Vehicle Tribo Data

David Valis¹, Libor Zak², Jiri Chaloupka³
¹University of Defence, Czech Republic
²University of Technology, Czech Republic
³Military Technical Research Institute, Czech Republic

RM 3 Reliability & Maintenance Engineering (3)

12/12/2013 13:30 - 15:00
Room: Satabud

Chairs: Om Prakash Yadav
Yiliu Liu

Abstracts: see page 78

Coast Down Time Analysis for Condition Monitoring: An Experimental Investigation to Study the Effects of Bearing Lubrication and Shaft Misalignment in Rotating Machinery

K P Ramachandran, Rameshkumar Ramaswamy, Lubulubah Hatif Al Hatmi
Caledonian College of Engineering, Oman

Estimation of Residual Life based on Vehicle Tribo Data

David Valis¹, Ondrej Pokora²
¹University of Defence, Czech Republic
²Masaryk University, Czech Republic

An Inspection-maintenance Strategy for Heterogeneous Systems with Measurable Degradation

Zhi-Sheng Ye¹, Mimi Zhang², Xun Xiao²
¹The Hong Kong Polytechnic University, Hong Kong SAR
²City University of Hong Kong, Hong Kong SAR

Condition Based Optimal Maintenance Strategy for Multi-Component System

Manish Rawat, Bhupesh Kumar Lad
Indian Institute of Technology Indore, India

Deriving an Empirical Model for Machinery Prioritization: Mechanical Systems Maintenance

R.M. Chandima Ratnayake¹, Dorota Stadnicka², Katarzyna Antosz²
¹University of Stavanger, Norway
²Rzeszow University of Technology, Poland

The Bivariate Generalized Variance |S| Control Chart with Runs Rules

Chee Jiun Chong, Ming Ha Lee
Swinburne University of Technology Sarawak Campus, Malaysia

RM 4 Reliability & Maintenance Engineering (4)

12/12/2013 15:30 - 17:30
Room: Satabud

Chairs: Ramachandran K P
R.M. Chandima Ratnayake

Abstracts: see page 79

In-Service Inspection of Offshore Concrete Structures: Application of an Expert System

Samindi Samarakoon, R.M. Chandima Ratnayake

University of Stavanger, Norway

Double Intelligence Contests vs. Impact Contest in Defending Genuine Object with Imperfect False Targets

Mengya Wan¹, Xiuyi Chen², Jun Yang¹, Rui Peng², Yu Zhao¹

¹*Beihang University, China*

²*University of Science and Technology, China*

Plant Systems and Equipment Maintenance: Use of Fuzzy Logic for Criticality Assessment in Norsok Standard Z-008

R.M. Chandima Ratnayake

University of Stavanger, Norway

Time-variant Reliability Analysis of Mechatronic Product Based on PSO and Up-crossing Rate Approach

Bo Liu, Jianguo Zhang, Pidong Wang, Zhiyi Ma

Beihang University, China

World Class Maintenance (WCM): Measurable Indicators Creating Opportunities for the Norwegian Oil and Gas Industry

Syeda Fahmida Imam¹, Jawad Raza¹, R.M. Chandima Ratnayake²

¹*Apply Sorco, Norway*

²*University of Stavanger, Norway*

Design an Effective Reliability Demonstration Test Plan using Six Sigma Approach

Mohamad Razif Mohd Idris, Azmir Aladin

MIMOS Berhad, Malaysia

TK 3 Technology & Knowledge Management (3)

12/12/2013 09:00 - 10:30
Room: Boontarik

Chairs: Suthep Butdee
Matti Karvonen

Abstracts: see page 80

Impact of Organizational Characteristics on the Relationship of Management Practice Factors, Efficient Technology Transfer and Firm's Business Performance

Nguyen Thi Duc Nguyen, Atsushi Aoyama

Ritsumeikan University, Japan

Technical and Non-Technical Innovation Models in China's SMEs: A Case Study

Jin Chen, Juxiang Zhou, Feng Xu, Yue Yin

Zhejiang University, China

The Impact of Scientific Knowledge Resources on Innovation Performance: A Case Study

Juxiang Zhou¹, Jin Chen², Xiaoting Zhao¹, Xiangzhen Yu³, Yue Yin¹

¹*Zhejiang University, China*

²*Tsinghua University, China*

³*Zhongkai University of Agriculture and Engineering, China*

Developing Proprietary or Open Source Technology: Learning from Five Case Studies

R R K Sharma, Ajay Jha, Sandeep Rajput

Indian Institute of Technology Kanpur, India

Overtime Reduction, Work-Life Balance, and Psychological Well-Being for Research and Development Engineers in Japan

Tetsushi Fujimoto, Sayaka Shinohara, Hideki Shimizu-Tanaka, Yoshifumi Nakata

Doshisha University, Japan

Integration of Design for X Approaches in the Concept of Lean Design to Enable a Holistic Product Design

Uwe Dombrowski, Stefan Schmidt

Technische Universität Braunschweig, Germany

SR 2 Safety, Security & Risk Management (2)

12/12/2013 11:00 - 12:30
Room: Boontarik

Chairs: Zhi-sheng Ye
Xiuju Fu

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Clarifying the Value Elements of Business Models for Disturbance Management in Supply Chains

Lea Hannola, Nina Tervonen, Ville Ojanen, Tuomo Kässi

Lappeenranta University of Technology, Finland

Customer Needs for Analyzing and Managing Disturbances in Transport Logistics

Nina Tervonen, Lea Hannola, Ville Ojanen

Lappeenranta University of Technology, Finland

Risk Management of Construction Projects Based on Sandpile Model: a Frame of Risk Conduction

Bingbing Xu, Y. Q. Chen, C. M. Wang

Tianjin University, China

Implications of Radioactive Contamination near Production Sites for Product Quality-related Risk Perceptions and Customer Loyalty

Bjoern Frank, Dinush Wimalachandra

Tokyo Institute of Technology, Japan

Research on Safety Management of Freeway Traffic

Bing Li

Hebei University of Technology, China

IS Intelligent Systems

12/12/2013 13:30 - 15:00
Room: Boontarik

Chairs: Yuri Popkov
Poobalan Govender

Abstracts: see page 82

Difference Priority Algorithm in Semiconductor Scheduling Problems

Kun-Ming Yu, Ming-Gong Lee, Chang-Hsing Lee, Yon-Yaw Chen
Chung Hua University, Taiwan

Fault Classification on High Voltage Power Lines Using Principal Component Analysis and Feed-Forward Artificial Neural Networks

Poobalan Govender, Neelendren Pillay, Kevin Emanuel Moorgas
Durban University of Technology, South Africa

Application of Estimation of Distribution Algorithms for Solving Order Acceptance with Weighted Tardiness Problems

Watcharee Wattanapornprom¹, Tiek Li¹, Warin Wattanapornprom², Prabhas Chongstitvatana²
¹*University of Science and Technology Beijing, China*
²*Chulalongkorn University, Thailand*

A Risk Assessment Model Using Artificial Neural Networks Case Study: National Iranian Oil Products Distribution Company (NIOPDC)

Ahmad Vedadi¹, Maryam Khajeh¹, Faezeh Montazeri²
¹*Islamic Azad University, Iran*
²*National Iranian Oil Products Distribution Company, Iran*

Dynamic Parallel Machine Scheduling Using the Learning Agent

Biao Yuan, Lei Wang, Zhibin Jiang
Shanghai Jiao Tong University, China

In-Service Inspection of Static Mechanical Equipment: Use of a Fuzzy Inference System for Maintaining the Quality of an Inspection Program

A.M.N.D.B. Seneviratne, R.M. Chandima Ratnayake
University of Stavanger, Norway

MS Manufacturing Systems

12/12/2013 15:30 - 17:30
Room: Boontarik

Chairs: Lionel Amodeo
Prafulla Kulkarni

Abstracts: see page 83

Design of Integrated Scheduling and Automated Controlling for Surface Treatment Process using Supervisory Control and Data Acquisition (SCADA)

Dida Damayanti, Haris Rachmat, Denny Sukma Atmaja
Institut Teknologi Telkom, Indonesia

Common Production Process Modeling for MES Based on Multi-Agent

Shikai Luo, Guiming Luo, Xibin Zhao
Tsinghua University, China

Genetic Algorithm Approach for Solving Intercellular Layout Problems in Cellular Manufacturing Systems

Prafulla Kulkarni¹, Kripa Shanker²
¹*Gokhale Education Society's R. H. Sapat College of Engineering, Management Studies and Research, India*
²*Indian Institute of Technology Kanpur, India*

Lean Implementation in Small and Medium Enterprises – A Singapore Context

Laura Xiao Xia Xu, Feng Yu Wang, Roland Lim, MH Toh, Ram Valliappan
Singapore Institute of Manufacturing Technology, Singapore

An Improved Binary Linear Programming Approach for Life Cycle Assessment System Boundary Identification

Feri Afrinaldi¹, Hong-Chao Zhang², John Carrell²
¹*Texas Tech University, United States, Andalas University, Indonesia*
²*Texas Tech University, United States*

Measurement of Manufacturing Effectiveness of a Company Using Analytical Hierarchical Process: A Case Study

Ramesh Lekurwale¹, Milind Akarte², D.N. Raut³
¹*K. J. Somaiya College of Engineering/Veermata Jijabai Technological Institute, India*
²*National Institute of Industrial Engineering, India*
³*Veermata Jijabai Technological Institute, India*

Poster Session 2

12/12/2013 15:00 - 15:30
Room: Krisana

p.84 A Conceptual Framework of an Integrated Fuzzy ANP and TOPSIS for Supplier Selection Based on Supply Chain Risk Management

Sittichok Sinrat¹, Walailak Attihirawong²
¹*Administration and Management College, King Mongkut's Institute of Technology Ladkrabang, Thailand*
²*King Mongkut's Institute of Technology Ladkrabang, Thailand*

p.84 An Analytic Network Process Model to Support Decision Making in a Pharmaceutical Supply Chain

Virginia Machado, Ana Paula Barroso, Virgilio Cruz-Machado
Faculdade de Ciências e Tecnologia, FCT, Universidade Nova de Lisboa, Portugal

p.84 Economic, Environmental and Social Responsible Supply Chain design Using Differential Evolution Multi Objective Algorithm

Shadan Tayyar¹, Daniel Roy², Farid Ghaderi³
¹*Ecole Nationale Supérieure d'Arts et Métiers, France, Metropolitan*
²*LGIPM - GIL, Ecole Nationale d'Ingénieurs de Metz, France, Metropolitan*
³*University of Tehran, Iran*

p.84 Determining and Classifying Drivers of Sustainable Competitive Advantages in Green Supply Chain Management: Resource-Based and Relational Views

Nisakorn Somsuk, Pongtiwa Pongpanich, Sombat Teekasap
Eastern Asia University, Thailand

p.84 Diversification of Supply Chain

James K. C. Chen¹, Tran Nguyen¹, Kaisa Chen¹, Ha Nguyen²
¹*Asia University, Taiwan*
²*Foreign Trade University, Viet Nam*

p.84 Reverse Logistics: A Business Opportunity in Time of Crisis

Manuel Monterrey, David de la Fuente, Isabel Fernandez, Jose Parreno, Rafael Rosillo
University of Oviedo, Spain

p.84 A Practical Supply Chain Risk Management Approach using VaR

Jasmine Jiamin Lim, Allan Nengsheng Zhang, Puay Siew Tan
Singapore Institute of Manufacturing Technology, Singapore

p.84 Optimal Design of Sewer Network by Tabu Search and Simulated Annealing

Shuang-Fu Yeh, Yao-Jen Chang, Min-Der Lin
National Chung Hsing University, Taiwan

- p.85 **An Improved Variable Neighborhood Search for the Open Vehicle Routing Problem with Time Windows**
Anak Agung Ngurah Perwira Redi, Meilinda Fitriani Nur Maghfiroh, Vincent F. Yu
National Taiwan University of Science and Technology, Taiwan
- p.85 **The Impact of Managers Selection Criteria on Quality of Capabilities: Are Managers only for Representative Function?**
Mait Rungi
Tallinn University of Technology, Estonia
- p.85 **Friction Between Foot and Floor Under Barefoot Conditions: a Pilot Study**
Kai-Way Li, Hsiao-Ching Wen
Chung Hua University, Taiwan
- p.85 **A Discussion of Multiple Learning Effects and Unconscious Behavior in the Software Debugging Process with Variable Potential Errors and Change-points**
Kuei-Chen Chiu, Shulan Hsieh
National Cheng Kung University, Taiwan
- p.85 **Determinants of Adopting Mobile Internet TV in Bangkok**
Sothaya Rasmidatta¹, Suphachet Phermphoonwatanasuk², Nopporn Srivoravilai¹
¹*Dhurakij Pundit University, Thailand*
²*Advanced Info Service PLC, Thailand*
- p.85 **Work Value and Motivation Mediate the Influence of Personality on Contextual Performance**
Zhijing Wang, Ji-Wei Ma, Yi Wen Chen
Chinese Academy of Sciences, China
- p.85 **The Associations between Emotional Intelligence and Academic Achievement: Mediator or Moderator effect of Learning Adaptability**
Xue Fei Zhou¹, Yi Wen Chen², Hui Xie¹, Hong Xie¹
¹*Bengbu Medical College, China*
²*Chinese Academy of Sciences, China*
- p.85 **Lower Bounds for Estimating Workforce Size in a 24/7 Company**
Jesús Lozano, Alberto Gómez, Raul Pino, Javier Puente, Borja Ponte
University of Oviedo, Spain
- p.85 **The Effect of Sound on Job Performance**
Veronika Siskova, Martin Juricka
Tomas Bata University, Czech Republic
- p.86 **Evaluation of a Collision Avoidance Display to Support Pilots' Mental Workload in a Free Flight Environment**
Yakubu Ibrahim, Peter Higgins, Peter Bruce
Swinburne University of Technology (SUT), Australia
- p.86 **Selection of Sub-contractors of the Project While Minimizing Settlements of Contractual Penalties and Success Fees**
Tomasz Blaszczyk¹, Pawel Blaszczyk²
¹*University of Economics, Poland*
²*University of Silesia, Poland*
- p.86 **Which Dynamic Capabilities Needed for Successful Promote of ERP Activity?**
Te-King Chien, Jhih-Cian Syue
National Formosa University, Taiwan
- p.86 **An Extended Risk Matrix Approach for Supply Chain Risk Assessment**
Zheng Ping Li¹, Gabriel Yee¹, Puay Siew Tan¹, Siang Guan Lee²
¹*Singapore Institute of Manufacturing Technology, Singapore*
²*Nanyang Technological University, Singapore*
- p.86 **A Comparison Between the Sprinklers Nozzles Dimensioning Imposed by the European and the American Fire Safety Norms – Case Study: A Warehouse Containing Plastic**
Marcello Fera¹, Raffaele Iannone², Alfredo Lambiase², Roberto Macchiaroli¹, Salvatore Miranda²
¹*Second University of Naples, Italy*
²*University of Salerno, Italy*
- p.86 **An Application of Learning Effects for Assessing Work Performance Using a Software Reliability Growth Model with Multiple Change-points**
Kuei-Chen Chiu, Shulan Hsieh
National Cheng Kung University, Taiwan

Session	TK 1 Technology & Knowledge Management (1)
Date	12/11/2013
Time	13:30 - 15:00
Room	Salon A
Chairs	Tuomo Kassi, Susan Morton

Business Management and Mobile Experience

Riccardo Cognini, Roberto Gagliardi, Alberto Polzonetti
University of Camerino, Italy

The large-scale access to content resources, the current change in the audience expectations, together with an underuse of the potentialities offered by mobile technology calls for a rethinking of the role of mobile interpretation within private and public business manager. Right in the in the area of intersection between business innovation and technology moves the paper, which deals, with the role of mobile technology in fostering learning and social engagement during the user experience. The main aim is indeed to provide developers with a framework able to guide a conscious design of content mobile experiences, fully exploiting the potentialities offered by this kind of technologies with clear objectives and the awareness of the means to achieve them. The spread of smartphones and tablets in the consumer market is having a big impact on the world of enterprise IT, with consumer-focused mobile devices making their way into the organization through the bring-your-own-device (BYOD) trend. One important aspect of coping with BYOD that is getting less attention, however, is the impact of employee data privacy legislation and how this creates constraints for IT managers implementing a BYOD policy. In this paper we have tried to provide answers to the many questions that innovation, business and mobile experience pose.

Organizational Innovation through Knowledge Taxonomy Model

Iwan Inrawan Wiratmadja¹, Augustina Asih Rumanti², Trifenaus Prabu Hidayat²

¹*Bandung Institute of Technology, Indonesia*

²*Atma Jaya Catholic University of Indonesia, Indonesia*

Knowledge is a form of intangible assets within company. Human resources will continue to grow into the company's strength in improving its sustainable competitive advantage. Efficiency and effectiveness are the main factors in the competitive business world. The object of this study is small and medium enterprise (SME) which processed natural stone. These organizations need for better knowledge management in order to achieve organizational effectiveness. This study aims to design a taxonomy model as part of a knowledge management system based on the business activities carried on by SMEs Taxonomy to overcome the problems of management and use of information and knowledge of technical competence in SME. The results of this research in the form of models of taxonomic knowledge technical competence in SME can be used to facilitate the management and use the knowledge as one of the activities in knowledge management.

Research on the Strategy of Patents Layout Basing on TRIZ

Hui Li, Runhua Tan, P. Jiang, H.G. Zhang

Hebei University of Technology, China

Patents layout can help enterprises increase competition, while TRIZ theory is a set of completed innovative approach from strategy to tactics, therefore, the innovative tools and resource of TRIZ being applied into patent layout strategy is proposed in this paper. The basic functions and auxiliary functions, which are used in patent analysis process, are established by using of functional analysis of TRIZ. The technical evolution theory and resource analysis of TRIZ are used to expand the innovative materials for patent applications. The configuration between the claims of independent right and dependent right of patents can be sorted out by TRIZ tools. Therefore, a set of methods and models of patent digging and layout for enterprise is established

Individual Tacit Knowledge for Organization's Competitive Advantage

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Tacit knowledge is an asset which plays a key role in the global competition, especially in improving the organization's competitive advantage. Most of tacit knowledge is kept by an individual. Competitive advantage determines the competitive position of the organization from its competitors. By optimizing the existing tacit knowledge, every individual in the organization achieves optimum competitive advantage. The main objective of this research is to analyze the correlation between individual tacit knowledge and the organization's competitive advantage. Tacit knowledge, competitive advantage and individual target are the constructs or latent variables that will be analyzed. The results of this research show that every indicator in each constructs have a good validity, reliability and significance level and indicates that the tacit knowledge of every individual in the organization needs to be considered by the organization to achieve its optimum competitive advantage.

Fostering Interdisciplinary Integration in Engineering Management

Tobias Vaegs, Inna Zimmer, Stefan Schröder, Ingo Leisten, R. Vossen, Sabina Jeschke

RWTH Aachen University, Germany

Research in the challenging field of industrial engineering and engineering management often needs the expertise from more than one discipline. Various disciplinary competences have to be combined to answer research questions and to solve specific (engineering) problems at the interfaces of different professional disciplines. The disciplines being part of the research and problem solving process have to be consequently integrated to form an efficiently performing interdisciplinary consortium. Current research states that this interdisciplinary integration process has to include various dimensions. This paper introduces three sets of interdisciplinary integration methods. Together they cover all of the dimensions explained before and lead to an enhanced interdisciplinary integration. Having just implemented a set of integration methods, measurement methods are adjusted to evaluate and optimize them continually.

Organizational Culture, Inter-organizational Learning Ability and Innovation Performance of the Technology Alliance of Small and Medium Enterprises

Xiaodi Zhang¹, Zhanxing Zheng², Kexin Huang¹, Ping Wang¹

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Technological alliance is regarded to have great impact on innovation of small and medium sized enterprises. However, little research has been done to examine why the individual enterprise has different innovation performance. This paper integrated developmental culture, inter-organizational learning ability and enterprise innovation performance in a model to make clear the innovation mechanism of individual enterprise in the SME alliance. The constructs of the three variables were given and the concept model was proposed first, afterwards an empirical research was carried out using the structure equation model and SPSS and AMOS as statistic tools. The results indicate that as two dimensions of inter-organizational learning ability, knowledge acquisition ability and knowledge absorptive capacity has significantly positive effect on enterprise innovation performance, while developmental culture has positive effect on enterprise inter-organizational learning ability. In addition, inter-organizational learning ability mediates the relationship between developmental culture and innovation performance.

Session	TK 2 Technology & Knowledge Management (2)
Date	12/11/2013
Time	15:30 - 17:30
Room	Salon A
Chairs	Roula Michaelides, R. Kant

The Impact of Shukko (Employee Transfers) within Group Companies on the Capability and Speed of Promotion of Engineers

Hideki Shimizu-Tanaka, Yoshifumi Nakata
Doshisha University, Japan

This study examined the impact of Shukko (employee transfer) experience of research and development (R&D) engineers in a Japanese automotive manufacturing group on their capability improvement and speed of promotion. It found that internal/external capabilities improve with the length of the service, and that internal/external capabilities improve with Shukko (employee transfer) experience and that Shukko and external capability do not have a significantly positive impact on the speed of promotion, and instead the level of internal capability is necessary for the speed of promotion.

Intrinsic Motivation and Creative Behavior: Moderating Role of Active Efforts

Sayaka Shinohara, Tetsushi Fujimoto, Hideki Shimizu-Tanaka, Yoshifumi Nakata
Doshisha University, Japan

According to the social-psychological research on creativity, intrinsic motivation for work is one of the significant factors associated with workers' creative behavior [2]. In addition to be highly motivated to work, having opportunities for active efforts, including selflearning, might have significant impact on creative job performance. Thus, we expect that employees with strong intrinsic motivation for work and opportunities for active efforts are likely to behave creatively at work. Using data from male Research and Development engineers in a Japanese automotive manufacturing group, this study investigates the moderating role of active efforts in the relationship between engineers' intrinsic motivation and creative behavior. We found that intrinsic motivation for work was positively associated with engineers' creative behavior. Furthermore, as we expected, the positive effect of intrinsic motivation on creative behavior becomes stronger when engineers have increased opportunities active efforts.

Technology Transfer Portals: A Design Model for Supporting Technology Transfer via Social Software Solutions

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²*Fraunhofer Institute for Production Technology IPT, Germany*

For staying competitive in times of shorter product life cycles, increasing technology complexity and rising efforts for technology development, inter- as well as intra-organizational technology transfer is once again gaining importance. In the past decade, the spreading of the Internet, faster Internet connections and more and more powerful web technologies – especially social software – paved a novel way for supporting technology transfer. Web based technology transfer portals offer a great potential for supporting technology transfer, especially in its early phases by bringing together technology demand and offer. However, technology transfer portals must be designed carefully in order to meet future users' needs and thus being successful in operation. In this paper a framework for designing these platforms according to specific transfer situations will be presented, taking into account the characteristics and goals of the portal operator and transfer partners as well as characteristics of the technologies to be transferred through the portal.

Comparison of Indicators to Detect Emerging Researches using Time Transition in Quasicrystals

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To survive worldwide competitions of research and development, decision-makers and researchers must detect the cutting-edge areas at the earlier stage. Now that computers enable us to process a large amount of data efficiently, bibliometric analysis can support decision-makers and researchers to invest into proper researches. We aim to find leading papers of the next generation with bibliometric approach.

We analyzed time transitions of indicators, and found that in-degree centrality, comminucability centrality and pagerank are useful as the indicators to detect emerging researches.

Identity Management for the Requirements of the Information Security

Mirley Ferreira, Kelly Alonso

Fluminense Federal University, Brazil

One of the factors in successful information security management is the integration of security policies, process, people and technology. The deployment of identity management integrates these factors and provides benefits to management. This paper aims to draw the process flow for a system of identity management and access (IdM) of a multinational company in the mining sector. In order to create a unique identification to user in all corporate information systems and a standardization process for access request. For this, a search was conducted in literature and a case to identify the business need. Finally, the study identified and showed the principal benefits generated by new process following the demands of SOX law.

Knowledge Management in the Chinese Local Beer Market: A Case Study

Jiageng Duan, Nachiappan Subramanian, Muhammad Abdulrahman

The University of Nottingham, China

Knowledge management has become an important resource for achieving success in today's uncompromising competitive market environment. Past studies have shown that knowledge management can significantly improve organization's performance and create competitive advantages. However, the implementation and development of knowledge management is an ongoing and difficult task. In this study, we examine the development and practices of knowledge management in a Chinese local beer company, including the incorporation of its supply chain members in such practices. It is observed that having a huge market share can temporarily suppress the importance of and the need for knowledge management practices, especially the need for forecasting related knowledge management.

Session	OR 1 Operations Research (1)
Date	12/11/2013
Time	13:30 - 15:00
Room	Salon B
Chairs	Mohamed K. Omar, Amir Azaron

Mathematical Modeling of Co2e Emissions in One-to-one Pickup and Delivery Problems

Emrah Demir, Tom Van Woensel

Technology University of Eindhoven, Netherlands

The road freight transportation sector is a significant emitter of carbon dioxide equivalents (CO₂e), which are directly proportional to fuel consumption. Multi-vehicle, multi-depot one-to-one pickup and delivery pollution-routing problem (PDPRP) is an extension of the classical vehicle routing problem with time windows (PDVRPTW) which consists of routing a number of vehicles to serve a set of customers and deciding on their speed on each route so as to minimize a total function comprising fuel and driver costs. A mathematical model of the one-to-one PDPRP is non-linear in nature, although it can be linearized and represented as a mixed integer linear programming formulation. Computational results show the importance of using fuel consumption objective instead of distance- or time-based cost functions.

G/G/1 Models for a Single Machine under Different Types of Interruptions

Kan Wu¹, Ning Zhao²

¹*Georgia Tech, United States*

²*Kunming University of Science and Technology, China*

Queueing theory is commonly used to evaluate the performance of manufacturing systems. Due to the complex nature of interruptions in practice, existing models cannot provide reliable estimates of the performance. This paper proposes a systematic way to classify different types of interruptions seen in a single machine system and suggests proper queueing models for each category. The G/G/1 approximate models are derived based on the insight from comparing different interruption types.

Improving Productivity of the SMEs in Singapore – Case Studies

Aloysius Lee, Roland Lim, Bin Ma, Laura Xiao Xia Xu

Singapore Institute of Manufacturing Technology, Singapore

For the Small and Medium Enterprises (SMEs) in Singapore, survival and growth depend critically on improving their productivity and thus helps Singapore to develop into an Operational Excellence Manufacturing hub in the world. Unfortunately, most of the current productivity planning methodologies is being developed from the perspective of the larger multinational companies (MNCs). This paper presents the Operations Management Innovation (OMNI) Programme with a productivity planning methodology that provides practical and procedural aid for productivity planning efforts for SMEs in Singapore, and applies it to three industry case studies. The discussions will highlight how the programme together with the methodology guides the practitioner through a series of welldefined steps necessary to improve productivity and achieve operational excellence.

A Note on Computing the Exact Probability Distribution of the Project Completion Time in a Stochastic PERT Network

Zdzislaw Milian

Cracow University of Technology, Poland

In this paper a recursive method of determining the exact probability distribution of the project completion time in stochastic PERT networks is presented. It is assumed that durations of particular tasks are independent random variables with known distributions. The method concerns any network and can be applied in the case of any continuous distributions of task durations. Examples of exact density functions of project completion time for some networks are given. A comparison with the straightforward method is also included.

A Bi-level Model for Resource-Constrained Multiple Project Scheduling Problems

Zhe Zhang¹, Yang Wang²

¹*Nanjing University of Science and Technology, China*

²*Sichuan University, China*

The aim of this paper is to present a bi-level model for the resource-constrained multiple project scheduling problems (RCMPSP). For the practical situation, the complex hierarchical organization structure and birandom environment are considered in the decision making process. For solving the bi-level model, improved particle swarm optimization algorithm is designed to obtain the optimal solutions. The results of an illustrative example are presented to highlight the practicality and efficiency of the proposed model and algorithm.

A Novel Multi-Objective Fuzzy Mathematical Model for Designing a Sustainable Supply Chain Network Considering Outsourcing Risk under Uncertainty

Firoozi Mehdi¹, Ali Siadat¹, Nima Salehi², S. M. Mousavi²

¹*Arts et Métier Paris Tech, France*

²*University of Tehran, Iran*

Industry managers and strategy planners are under rising pressure to continuously develop sustainable supply chains economically, environmentally and socially. The design of sustainable supply chain networks has attracted more attention in recent years according to business and environmental factors. In today's competitive environment the selection of appropriate suppliers is a considerably significant decision for an effective supply chain management. Appropriate suppliers reduce purchasing costs, decrease production lead time and defects, increase customer satisfaction and strengthen corporate competitiveness. This research proposes a bi-objective fuzzy mathematical programming model for designing the strategic configuration of a sustainable supply chain network under uncertain conditions. An original equipment manufacturer that is concerned with minimizing the environmental impact of its activities and risks should design the network based on the trade-off between costs and respective emissions. The negative environmental impact is assessed by measuring CO₂ emission during the manufacturing, remanufacturing and transportations.

Session	OR 2 Operations Research (2)
Date	12/11/2013
Time	15:30 - 17:30
Room	Salon B
Chairs	Kiyoshi Sawada, Ning Zhao

An Improved Heuristic Algorithm for the Special Case of the Set Covering Problem

Amnon Gonen, Tzhi Avrahami, Uriel Israeli
HIT - Holon Institute of Technology, Israel

The set covering problem is well known as an NPcomplete problem. A common heuristic family of algorithms that solves the problem is the Greedy type algorithm. In this study, we have to cover N sites by allocating a minimum number of servers. Each server covers a predefined pattern and, by locating it to a site K , it covers its neighbours according to its pattern. The Improved Heuristic Algorithm (IHA) presented here looks, at each iteration, for the most "problematic" site to be covered and selects the best server that covers it.

The study compares the IHA with the Greedy algorithm. The results show that in most cases, for symmetric servers, the IHA finds a better solution (more than 10,000 problems were tested). For big problems of above 600 sites, the probability of finding a better solution is over 80%. However, the computing time of the IHA is much higher than that of the Greedy algorithm.

Analyzing some cases where the Greedy algorithm found better solutions than the IHA brought us to the conclusion that the weakness of the IHA resides in the selection part of the minimal server's location. However, we have not yet determined the best solution for these cases.

Efficiency Improvement in Explicit Enumeration for Integer Programming Problems

Shin-Guang Chen
Tungnan University, Taiwan

An integer programming problem is a mathematical optimization or feasibility program in which some or all of the variables are restricted to be integers. In many cases, the problems can be divided into integer linear programming (ILP) problems and integer non-linear programming (INLP) problems. A more complex problems are mixed integer programming (MIP) problems. There are many algorithms to well solve ILP problems. However, there are relatively fewer algorithms to solve INLP problems. In most situations, the explicit enumeration method (EEM) can be used to solve both kinds of problems. EEM is very simple to implement but with the price of low efficiency. This paper proposes an efficient approach namely Chen's rearrangement to improve the efficiency in explicit enumeration for integer programming problems. Part of them can also be applied to MIP problems. An interesting example is explored to explain the proposed approach.

A New Methodology for Solving Multi-Objective Stochastic Optimization Problems with Independent Objective Functions

Saltuk Selcuklu¹, David Coit¹, Frank Felder¹, Mark Rodgers¹, Naruemon Wattanapongsakorn²
¹*Rutgers University, United States*
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For multi-objective optimization problems, a common solution methodology is to determine a Pareto optimal set. However, the Pareto optimal set only pertains to deterministic results. Our research aims to introduce Pareto Uncertainty Index which reflects the stochastic nature of the problem in the results. The proposed method is applied to a simplified Generation Expansion Planning problem to test the Pareto Uncertainty Index idea.

Optimal Pricing and Inventory Policy with Delayed Payments and Order Cancellations

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²*Lingnan College, Sun Yat-sen University, China*

Considering a periodic review system where the seller allows customers' delayed payments, referred to as cash-on-delivery payment scheme, we investigate the seller's optimal pricing and inventory control policy. Specifically, we examine the impact of customers' order cancellations, possibly due to their expectation of price markdown in the future. Under mild conditions, we show that the base-stock list price policy is optimal. We also investigate the impact of the customers' strategic behavior of order cancellation and their price sensitivity on the optimal retail price and inventory policy.

Optimal Scheduling Problem for Taiwan Post Office Counters and Manpower

Gwo-Liang Liao, Wen-Hsin Chiang
National Taitung University, Taiwan

In this study, we develop several models that combine with queuing theory in order to help a post office to solve the optimization of staff numbers at services counters comply with practical demands. The models are formulated using linear programming. A numerical example is presented to illustrate the models and the solution method using real data from a post office in eastern Taiwan. Analytical results indicate that the proposed models are efficient in improving service efficiency and customer satisfaction, and can be a reference for practical manpower allocation in the post office.

Modeling and Solution of Practical Airline Crew Scheduling Problems

Yu Iijima¹, Tatsushi Nishi¹, Masahiro Inuiguchi¹, Satoru Takahashi², Kenji Ueda³, Keiji Ojima³
¹*Osaka University, Japan*
²*Mitsubishi Electric Corporation, Japan*
³*Mitsubishi Electric Information Systems Corporation, Japan*

We study on the modeling and solution of practical airline crew scheduling problems. The problem determines a feasible assignment of flight duties to the set of crews. Two types of integer programming formulations with cell model and graph models are developed. An efficient solution algorithm based on labeling algorithm is proposed. The validity of the proposed models is compared by using a general-purpose solver. The computational results show that cell model is better than those of the graph model with less decision variables.

Session	HF 1 Human Factors (1)
Date	12/11/2013
Time	13:30 - 15:00
Room	Rachavadee
Chairs	Myung Hwan Yun, Kai-way Li

Knowing What a User Likes: Mobiquitous Home with NFC Smartphone

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The gaining popularity of Near Field Communication (NFC)-enabled applications has been facilitated by increased levels of NFC smartphone adoption. However, the existing touch-driven interaction using NFC smartphone for home environment is neither quick nor convenient. The primary contribution of this paper is to introduce a novel solution for a convenient mobiquitous home service, allowing users to operate digital appliances upon touching a photo interface with their NFC smartphones. This system is known as NFC Smartphone Entertainment Systems (NFC SES). This paper also validates the user perception and behavioral intention to use NFC SES. Fifty-two participants participated in the experiment and user evaluation. Results indicated that perceived ease of use was a causal antecedent to perceived usefulness. Individuals' behavioral intention to use NFC SES was built through user's perceived usefulness and convenience. Our findings offer a fresh insight for scholars, mobile device manufacturers and service providers in developing NFC-enabled applications.

Anthropometric Measures and Static Muscular Strengths for Youths Males and Females

Kai-Way Li, Chao-Cheng Su, Szu-Yin Huang

Chung Hua University, Taiwan

Teenagers are in a growth spurt both in body dimensions and in physical strength. Isometric strength is commonly adopted to indicate the physical capability of humans to perform manual tasks. This study presents the data collected from 120 adolescences concerning their anthropometric measures and four isometric strengths. Both youth males and females, aged 13 to 15 years old, were recruited for measurements. The results of the study indicated that all the four strength were significantly ($p < 0.05$) affected by age and gender. Among the four strengths, isometric back strength was significantly ($p < 0.05$) the highest, next with the isometric leg strength, and next the isometric shoulder strength, and finally the isometric arm strength. The 15 years old subjects had significantly the highest isometric strengths than the other two age groups. It was found that the isometric strengths for female subjects were approximately two third of those of the male subjects. The Pearson's correlation coefficients between the variables were calculated. Stature and body weight were found to be the two most significant parameters related to the isometric strengths of the subjects. These strength data are valuable for designs not only in manual handling tasks but also in the facilities involving physical activities for teenagers.

Relationship between Floor-type Gait Adaptations and Required Coefficient of Friction

Kai-Way Li, Szu Yin Huang, Chien Wen Wang

Chung Hua University, Taiwan

A gait experiment was conducted. Female subjects were requested to walk, with or without shoes, on a walkway at 2.5 km/hr. Four floors and three surface conditions were tested. The ground reaction forces were collected using a force platform. The required coefficient of friction (RCOF) was calculated. The peak RCOF was analyzed. The results indicated that the floor, surface, and shod conditions were all significant factors affecting the RCOF. The interaction effects of the shod \times floor were also significant. The RCOF for the barefoot conditions was significantly lower than that of the shod conditions. The multiple comparison test results indicated that ceramic and steel floors had both significantly higher RCOF than those of the vinyl and wood floors. For surface conditions, dry surface had significantly the highest RCOF among all surfaces. The RCOF on the wet surfaces were significantly higher than that on the glycerol contaminated surfaces.

Subjective Rating of Floor Slipperiness & Slip/Fall Outcomes in a Gait Experiment

Kai-Way Li, Chien Wen Wang, Szu-Yin Huang

Chung Hua University, Taiwan

Slips and falls create major burdens for both the industries and our society. A gait experiment was conducted in this study. The subject walked on a 6 m walkway with or without shoes and stepped on a tested area. The tested area was covered with one of the four floors: steel, wood, vinyl, and ceramic. The surface of the tested area might be dry, wet, or oily-contaminated. The subjective rating of floor slipperiness on the testing area was collected after the walk. The outcome of a trial was also recorded as without slip/fall, slipped without fall, or slipped and fall. It was found that the subjective ratings of floor slipperiness between the barefoot condition and shod condition were statistically significantly ($p < 0.0001$) on both dry and oily floors. Chi-square homogeneity tests on the outcome of slip/fall were performed. The results showed that the distribution of slip/fall outcomes were associated with the with/without shoes conditions. More slipped and fall cases were observed when the subjects were barefooted.

Quantification of Human Error Rate in Underground Coal Mines - A Fuzzy Mapping and Rough Set Based Approach

Suprakash Gupta, Pramod Kumar, Netai Chandra Karmakar, Sanjay Kumar Palei

Indian Institute of Technology (BHU), India

A precise value of human error rate is imperative to probabilistic safety and risk analysis. Prevailing methods for error quantification are domain specific and provide a crude estimate only. Human error rate (HER) in mines are influenced by the context or performance conditions that are assessed using a set of context describing factors (CDFs). A set of linguistic levels describe the state of the CDFs. An exhaustive set of possible combination of CDFs represent the universal set of context. The relation between context and human error rate can be modeled by mapping the fuzzy set of context to the fuzzy set of HER. The HER of a mine can be estimated from the subjective assessment of CDFs using the concept of rough set.

A Case Study Evaluating the Impact of Human Behavior on a Manufacturing Process In-line with Automatic Processes by Means of a Simulation Model

Ana Eduarda Sa Silva¹, Michael Donauer¹, Americo Azevedo¹, Paulo Peças², Elsa Henriques²

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In many manufacturing systems human resources are essential in some cognitive intensive tasks while the more repetitive ones are assigned to automatic systems. If on the one hand, automation has a deterministic pace; humans are known by a flexible and variable work manner. Therefore, a reliable description of both hardware and human components is required for designing such manufacturing systems.

The purpose of this paper is to investigate the impact of the variable throughput of a manual process in a production flow that contains automatic processes upstream and downstream. With regard to the description of human behavior, two sources of variability were considered: natural and abnormal variability. Natural variability refers to the differences in terms of processing times that can be found among individuals. Organizational aspects such delays in shift changing and breaks along the shift, are referred as abnormal variability, and were also investigated by means of an analytical and simulation models.

Session	DM 1 Decision Analysis & Methods (1)
Date	12/11/2013
Time	15:30 - 17:30
Room	Rachavadee
Chairs	Yves De Smet, Naragain Phumchusri

Leadership Selection, Punishment Salience and Cooperation

Yanmei Li¹, Miao Chao²

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Power, punishment, and leadership selection influence cooperation. In this research, we test the hypothesis that salient punishment, rather than non-salient punishment, can improve the cooperation of the powerholders selected through exams (e.g., civil servants) and that punishment, whether salient or non-salient, can improve the cooperation of the powerless. Results of the experiment that used the commons dilemma provide evidence for this hypothesis and are discussed in terms of leadership selection, punishment salience, and further implications for corruption prevention.

Efficiency and Productivity Growth of Technology-Based Firms in Business Incubators: A DEA and Malmquist Index Approach

José Santos, Antonio Grilo

Universidade Nova de Lisboa, Portugal

Business Incubators can play a major role in helping to turn a business idea into a technology based organization economically efficient. However, there is a shortage in the literature regarding the efficiency evaluation and productivity evolution of the new technology-based firms (NTBFs) in the incubation scope. This study aims to develop a model based on the Data Envelopment Analysis (DEA) methodology, which allows the incubated NTBFs to evaluate and improve the efficiency of their management. Moreover, Malmquist index is used to examine productivity change. The index is decomposed into multiple components to give insights into the root sources of productivity change. The proposed model was applied on a case study with 13 NTBFs incubated. In the case study it was possible to conclude that inefficient firms invest excessively in Research and Development (R&D), and on average, firms have a productivity growth in the period of study.

A Decision Analysis for the Dynamic Crop Rotation Model with Markov Process's Concept

Tyrone T. Lin, Chung-Hsiao Hsieh

National Dong Hua University, Taiwan

This paper mainly explores when the agricultural industry faces grain crop price fluctuations and natural climate changes, it will take which level of price of grain crops and what probability of climate changes for developing a dynamic grain crop rotation model. In the previous paper the authors introduce the mixed strategy of game theory to construct a 2-player game. In consideration of the pursuit of the maximization of their own interests, the decision-making of dynamic grain crop rotation is the main focus of the previous paper, and it will be extended to a multiple stable dynamic grain crop rotation strategy cycle. And now the authors develop a stationary Markov process as the basis for a final decision. Markov chain is a method frequently used in decision-making and is a model simple to discuss.

A New Version of 2-Tuple Fuzzy Linguistic Screening Evaluation Model in New Product Development

Wen-tao Guo, Van-Nam Huynh

Japan Advanced Institute of Science and Technology, Japan

The screening of new product projects is critically important for the survival of companies. Many approaches have been developed to deal with this screening process. In this paper, we introduce a kind of proportional 2-tuple fuzzy linguistic screening evaluation model and the so-called preference preserving transformation based on canonical characteristic values. It is shown that this new screening evaluation model not only purges the traditional requirement of equal distance between labels but also has the ability to reflect the confidence levels of evaluators on judgments, whereby enriching the information of final result and accordingly supplying a more comprehensive guidance for decision-makers. A case study taken from the literature is used to illuminate the proposed technique.

The Position of Sustainable Corporate Social Responsibility in the Process of Creating Sustainable Prosperity in the European Union

Oliver Moravcik, Lubomir Smida, Peter Sakal

Slovak University of Technology, Slovakia (Slovak Republic)

The aim of the article is to analyse the status of Sustainable Corporate Social Responsibility in the area of the European Union. The article shows the development of the concept of Corporate Social Responsibility. There is highlighted the enterprise potential to address current social and environmental issues and achieve a competitive advantage. Sustainable Corporate Social Responsibility reflects the need to implement socially responsible activities throughout whole value chain and thus contribute to creating sustainable prosperity in the European Union.

Evaluating and Benchmarking Operational Performance of Manufacturing Facilities in Networks of Multinational Corporations

Alireza Tavakoli, Marco Biesen

Fraunhofer Institute for Material Flow and Logistics, Germany

Many multinational corporations (MNCs) generate their revenue abroad and feature different manufacturing facilities in various countries. Within the network of a MNC, each facility exhibits its own functional strategies. Thus, the individual strategic role of each facility has to be considered in performance evaluations. However, popular evaluation and benchmarking methods do not take this adequately into account. Moreover, decision-makers are often overstrained with numerous performance measures, which make evaluations even more challenging. The purpose of this paper is to present a performance evaluation and benchmarking method, which provides the possibility to evaluate manufacturing facilities in networks of MNCs under consideration of their individual functional strategies without overstraining decision-makers with an excess of performance measures. Based on an aggregated single index of overall performance, each facility is evaluated. In this way, operational performance can be easily compared among all facilities in spite of their different functional strategy.

Session	SC 1 Supply Chain Management (1)
Date	12/11/2013
Time	13:30 - 15:00
Room	Ubonchard
Chairs	Gaurav Tejpal, Loganathan Ponnambalam

Optimization of Forest Vehicle Routing Using Reactive Tabu Search Metaheuristic

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Forest vehicle routing is an important step in optimization of forest transportation system to minimize the total cost. To perform this work, we propose a mathematical model and use a reactive tabu search metaheuristic approach. The objective is to minimize the total cost and respecting the time window of all customers which is sometime important in this field. Finally, the experimental results obtained with the reactive tabu search metaheuristic approach of the named vehicle routing problem is showed, and compared to its great deluge results.

An Inoperability Input-output Model (IIM) for Disruption Propagation Analysis

Chin Sheng Tan¹, Puay Siew Tan¹, Siang Guan Lee², Manh Tung Pham¹

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²*Nanyang Technological University, Singapore*

Today's Supply Chains (SCs) are global and getting more complex, due to the exigencies of the world economy, making them hard to manage. This is exacerbated by the increasingly frequent occurrence of natural disasters and other high impact disruptions. To stay competitive, companies are therefore seeking ways to better understand the impact of such disruptions to their SCs. In addressing this need, this paper proposes an approach for disruption propagation analysis. We develop a method based on a variation of an Inoperability Input-Output Model (adapted from a Leontief I-O model) to quantify the impact of disruptions across the entire SC. We then analyse the factors that have the most influential impacts on the SCs during disruptions. Initial results show that trading volume handled by a company/ node is an important factor in determining the disruption impact to SCs, besides the number of SC partners (connections) as implied from previous work.

Improvement to the Freight Management of ITAR Controlled Items using Lean Six Sigma

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This paper was conducted at an aircraft spare management company located in Singapore, which support several overseas offices, including the four offices located in US. Non-compliance findings were reported by the US authorities on several occasions in the past one year with several warning being served to the organisation. To eradicate this problem, this paper attempts to identify the potential causes in the inaccuracy of the shipment preparation process using Lean Six Sigma concepts and tools. The project successfully reviewed the shipment preparation process using the DMAIC framework and identifies areas of improvement within the process, which were prioritised for review and action. The eventual outcome exceeded the initial target of improving the shipment process so as to reduce/eliminate the opportunity for error. The MRP review further improved the redistribution of spares, reducing the shipment frequency and balance out the workload distribution among the warehouses.

Performance Measurement of a Dairy Supply Chain: A Balance Scorecard Perspective

Gyan Prakash¹, Rakesh Pant²

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²*Aligarh Muslim University, India*

This article presents a case of the Indian dairy supply chain and demonstrates how balance score card (BSC) may be used to measure its performance. There are few studies which use BSC in the performance measurement of a food supply chain and no one has used it in the context of dairy supply chain. In this study, four components of BSC have been adapted to measure various performance related issues pertinent to the dairy supply chain in a State in India. Dairy supply chain practitioners would find this approach useful for value generation across various stages of dairy supply chain

Modeling Supply Risk using Belief Networks: A Process with Application to the Distribution of Medicine

Kanogkan Leerojanaprapa, Robert van der Meer, Lesley Walls

University of Strathclyde, United Kingdom

We propose a modeling approach based on belief networks to capture and understand the systemic nature of risks affecting supply networks. By aligning the purpose of a model with the nature of supply management decisions, we provide a mechanism for identifying relevant supply risks so that we can visualize inter-dependencies between risks and predict their effects on supply performance. By using a belief network modeling formalism we can use diagnostics to understand the key drivers of unwanted risk scenarios and to explore the efficacy of possible risk mitigating actions. We illustrate how belief network modeling can be used to manage the risk/reward position and provide new insights into supply risks through an example for the medicine supply chain of a regional health service provider.

Social Media for Supply Chain Risk Management

Xiuju Fu, Rick Siow Mong Goh, Joo Chuan Tong, Loganathan Ponnambalam,

Xiao Feng Yin, Zhaoxia Wang, Haiyan Xu, Sifei Lu

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With the rapid increase of online social network users worldwide, social media feeds have become a rich and valuable information resource and attract great attention across diversified domains. In social media data, there are abundant contents of two-way and interactive communication about products, demand, customer services and supply. This makes social media a valuable channel for listening to the voices from the market and measuring supply chain risks and new market trends for companies. In this study, we surveyed the potential value of social media in supply chain risk management (SCRM) and examined how they can be applied to SCRM systematically. We found that while such medium is very useful in supply chain risk management, it also brings along a new risk to supply chains, so called social media risk, as supply chain incidents may be rapidly transmitted and magnified through social media platforms worldwide. Accordingly, a new framework is proposed that assists the hiring of social media to serve supply chain risk management tasks.

Session	SC 2 Supply Chain Management (2)
Date	12/11/2013
Time	15:30 - 17:30
Room	Ubonchard
Chairs	Jui-Sheng Chou, Regena Scott

Time-phasing and Decoupling Points as Analytical Tools for Purchasing

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Customization and customer-driven manufacturing are both explicitly based on end-customer relations and customer requirements. The impact of these aspects on internal operations is relatively well known and can be investigated using time phasing and decoupling points. These tools are however rarely used for analyzing purchased material. Based on the time phased product structure, items are categorized according to three criteria: driver, uniqueness, and make/buy. Purchased items can thus be identified using the last criteria and then driver and uniqueness are used as a point of departure for categorizing purchased material. The approach hence provides a platform for development of supplier relations based on the customer requirements which is the core theme of the method for customer-driven purchasing.

An Integration of AHP Approach and Bayes Classification Algorithm in Supplier Selection

Felix Chan, Nick Chung, Jenny Chow, Ben Niu

The Hong Kong Polytechnic University, Hong Kong SAR

Weight of criteria can only be changed through discussion or analysis of experts under traditional supplier selection method, which brings up two problems: (1) human effect problem and (2) incapability in timely decision making on updates of weights. In this paper, a new supplier selection method based on integration of Analytic Hierarchy Process, the Bayesian Classifier Algorithm and dynamic probabilities (AHP-BCA) is proposed. The method makes predictions with the probabilities of occurrences of criteria values based on historical records to avoid any human effects in decision making. It is also equipped with an instant self-update function to instantly update the probability values with new data, and be ready for next calculation. A simulation experiment is conducted to compare the performance of the proposed approach with a remarkable traditional approach in literature with historical data. Results show that the proposed approach can outperform the traditional one in achieving better selection results.

Optimal Pricing and Returns Policies for Innovative Products with the One-Shot Decision Theory

X. Ma, Peijun Guo

Yokohama National University, Japan

This paper deals with the channel coordination problem in the supply chain for an innovative product. The partially known information about the demand is represented by a possibility distribution. Since the life cycle of the innovative product is short, how to determine the optimal order amount is a typical one-shot decision problem. With the one-shot decision theory, Stackelberg equilibriums are obtained for the optimal wholesale price of the manufacturer and the optimal order quantity of the retailer with price-only contract (asymmetric information) and returns (symmetric information). The channel coordination is achieved by using returns policies. The proposed models are scenario-based decision models which provide a fundamental alternative to analyze issues of channel coordination for innovative products.

Barriers to Green Supply Chain Implementation in the Electronics Industry

Sorraya Khiewnavawongsa¹, Edie Schmidt²

¹Chiang Mai University, Thailand

²Purdue University, United States

This study identifies barriers to green supply chain management implementation in the electronics industry. The study explores factors that prevent companies from implementing green projects, and identifies green implementation types that the electronics industry has adopted. Data was gathered by interview and survey methods, which participants represented manufacturers and distributors in the US electronics industry. Survey questions included 33 barriers to green implementation, and readiness to green implementation using six implementation types. Data was analyzed by SPSS. Results showed that the financial impact is the major factor for green implementation by electronics companies. Company size did not impact green supply chain barriers. However, small-sized companies were less ready to implement green initiatives for most projects. Generally, distributors were more affected from barriers to green implementation than manufacturers. Electronics companies were most ready to implement with green manufacturing and packaging projects while green suppliers projects were least ready for implementation.

An EOQ Model with Consideration of Second-Trip In-Store Replenishment

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¹Asian Institute of Technology, Thailand

²Kasetsart University, Thailand

Ideally, the aim of a retail store is single-trip in-store replenishment. In other words, a store worker should only need to make a single trip to fill the shelves after a product has been delivered to the store. This can be achieved if the size of the lot received is smaller than the shelf space minus the number of units left on the shelves at the time of shelf replenishment. In this paper, we introduce the consideration of the in-store handling cost for the second trip in an EOQ-type model to determine the optimal order quantity, given the available retail shelf space. Our model considers the case where products are ordered in multiple packs and one part of the distribution-handling cost is the cost per each pack handled. The insights gained from the model will help manufacturing managers, vendors and retail managers make better decisions with regard to the lot size produced, ordered, and delivered as part of an effective supply chain management strategy.

Prioritizing Lean Supply Chain Management Initiatives in Healthcare Service Operations: A Fuzzy-AHP Approach

Tritos Laosirihongthong¹, Premaratne Samaranyake², Dotun Adebajo³

¹Thammasat University, Thailand

²University of Western Sydney, Australia

³University of Greenwich, United Kingdom

The main purpose of this study is to propose a holistic approach for prioritizing lean SCM initiatives in healthcare service operations, based on relative weights of various initiatives on a range of performance measures for better understanding of what motivations and supporting factors influence the selection of LSCM initiative/strategy. Twenty-four LSCM initiatives were identified, using a comprehensive literature review. Q-sort method was initially used to categorize those initiatives into four categories: (a) Continuous process improvement; (b) Enterprise alignment/integration; (c) Waste elimination; and (d) Flow management/JIT. Fuzzy AHP was used to prioritize the four categories based on its relative weight of importance on three different performance dimensions. The result shows that continuous improvement is a dominating LSCM initiative in increasing operational and financial performance while enterprise alignment/integration is a dominating initiative in enhancing organizational images and operational performance. Finally, it is noted that customer needs and influence are the most important drivers to encourage hospital to adopt LSCM strategy.

Session	SI 1 Service Innovation & Management (1)
Date	12/11/2013
Time	13:30 - 15:00
Room	Jamjuree
Chairs	Han Tong Loh, Alexandra Medina-Borja

Service Performance Evaluation using Fuzzy Semantic Extraction of On-line Reviews

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University of Puerto Rico at Mayaguez, Puerto Rico

We are presenting a methodological approach to transform customer online reviews into quantitative metrics with the purpose of incorporating them into a service performance benchmarking methodology. We build on existing work in different fields, namely sentiment analysis and semantic orientation to extract the online opinions, and fuzzy logic to quantify the results into representative metrics of service quality. Fuzzy numbers were used to represent the linguistic scale behind customer online comments that reflect their evaluation of the service. We then use Data Envelopment Analysis (DEA) to quantify the performance of comparable service units. We test our methodology using published tourist destination data for the Caribbean Islands in addition to online reviews left by visitors to each island in a well-known customer review website.

Investigation of Team Composition and Task-related Conflict as Determinants of Engineering Service Productivity

Philipp M. Przybysz, Soenke Duckwitz, Susanne Mütze-Niewöhner, Christopher M. Schlick

RWTH Aachen University, Germany

Although the early phases of engineering service projects are essential for product success, methods and tools to proactively and comprehensively evaluate the productivity of complex service processes are rare. In this paper the effects of team composition in terms of age diversity and task-related conflict on the outcome of a R&D task are examined in a laboratory experiment. Age heterogeneous and age homogeneous project teams were build and the level of task-related conflict was measured by means of an established instrument as a qualitative team aspect. In the outcome dimension the number of ideas generated during a brainstorming represents the quantitative team performance. To obtain also a quality oriented view of team performance, the final task results were evaluated by domain experts. This evaluation allows the analysis of the impact of one isolated influence factor on service productivity across the whole chain of value creation within a complex engineering service setting.

The Service Science Practical Research of the BEST Model: The C telco's IPTV Service in Taiwan as the Example

Hung Chih Lai¹, Yao Cheng Yu², Kae Kuen Hu², Chien-Ming Tung²

¹*Shih Chien University, Taiwan*

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IPTV is a developing and advanced competitive service in the media market. However, IPTV markets all over the world seems very different. For example, the IPTV development of EU countries is faster than Asian countries. The research utilized some convergence methodologies to verify why the subscription of C telco's IPTV in Taiwan is too low to expand economies of scale. We recommend that C company must have a positive and aggressive attitude to battle the multimedia war. Secondly, C company need to improve their watching and remote utility of user experience. Thirdly, C company must set a barrier (such as developing a killer application) to remind consumers' motivation or avoid other potential competitor coming.

Influencing Factors on the Productivity of Knowledge-intensive Services

Robert Stranzbach¹, Alexander Rannacher¹, Flavius Sturm², Susanne Mütze-Niewöhner¹

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In this paper it will be explicated which are the most important influencing factors on the productivity of knowledge-intensive services. After a short introduction about knowledge-intensive services and research proceedings the authors will present the identified influencing factors on the productivity of knowledge intensive services. These influencing factors will be assigned to the three dimensions of the service provision: Potential, process and outcome. Conclusive the findings and especially the influencing factors will be discussed and an outlook on further research will be given.

Design Driven Product-Service Innovation in Manufacturing

David Opresnik, Christian Zanetti, Marco Taisch

Politecnico di Milano, Italy

Often different research fields provide their own perspective on the same topic, many times implicitly and unknowingly. If made aware one of each other, they could purposively draw from each other, creating novel archetypical solutions in their own field. Conversely, such attempts are scant. Correspondingly, the purpose of this article is to scrutinize the bidirectional linkage between the pervasive concept of Product-Services (P-S) in manufacturing with the novel innovation strategy Design Driven Innovation (DDI). The latter aims at providing radical changes in the meaning of the product. Our findings depict that the P-S strategy is a viable approach to create radical changes of meaning using DDI, which is not solely oriented on existing users' needs, but is foremost creating new ones. This findings call for a revision of existing definition of servitization. Finally, the potential benefits of PS are depicted in the DDI strategy.

Service Performance Assessment and Governance

Marco Taisch¹, Mohammadreza Heydari Alamdari¹, Christian Zanetti¹,

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¹*Politecnico di Milano, Italy*

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Performance Indicators (PIs) are designed to help organizations and decision makers to better understand how well they are performing in relation to their strategic and tactical goals; nowadays, numerous methods and tools have been developed to facilitate the generation and selection of the most suitable PIs. Especially in the service sectors, service performance assessment methods should be used to develop a coherent and comprehensive set of service driven performance indicators. The basic idea behind a performance assessment method in the service system is to generate and select the performance indicators to be used by the members of the service delivery eco-system, which represent the actors for the delivery of services. In this respect, the purpose of this paper is to lay out a method for generating and selecting the performance indicators related to particular service system requirements. To accomplish this, the proposed method will be defined to optimize monitoring and controlling activities within a service system. In order to be able to produce meaningful results a case study is presented, where the method has been adopted by a company producing domestic appliances.

Session	QC 1 Quality Control & Management (1)
Date	12/11/2013
Time	15:30 - 17:30
Room	Jamjuree
Chairs	Henrik Eriksson, Nachiappan Subramanian

Detecting High Incidence by Using Variable Scan Radius

Chen-ju Lin, Yi-chun Shu
Yuan Ze University, Taiwan

This research aims at detecting spatiotemporal clustering with increased mean. Scan statistics are popular methods for spatiotemporal surveillance. Several likelihood-ratio (LR) and exponentially weighted moving average (EWMA) based scan statistics have been studied for the scenarios with known or unknown size of shifted coverage. However, the existing EWMA-based methods applying fixed radii may not be efficient to detect the cluster with unknown shifted coverage. This paper proposed an EWMA-based scan statistic with variable scan radii to detect clustering instead. The proposed statistic weights the observations by distance in each circular scan window and uses the EWMA technique across the temporal axis. Comparing to the LR-based scan statistic with variable scan radii, the proposed method can be more sensitive when clusters occur at the early stage. The proposed method would have advantage in solving practical problems with unknown size of shift coverage.

Application of Six Sigma Methodology for a Manufacturing Cell- A Case Study

Vijaya Kumar, V Prashant, K N Subramanya, N S Narahari
R.V.College of Engineering, India

A medium scale Auto Component manufacturing unit produces Link, Valve, Motor Piston, CAM shaft and Universal joint. The initial study revealed that 80% of total defects were due to link component. The 1500 parts / day of link is produced. The work carried out focused on improving quality of link using Define, Measure, Analyze, Improve, Control [DMAIC] methodology. A supplier, Inputs, Process, Outputs, Customers [SIPOC] and High level process mapping was used as tools. There were 11 Critical To Quality [CTQ] parameters identified. Low sigma value for outer diameter was traced by conducting Process Capability Studies. Causes for Low Process Capability [Cp] & Process Performance [Cpk] values were determined through brainstorming. Failure Modes and Effects Analysis [FMEA] was also used to understand effects of different parameters and methods to control. The outcome of the work improved sigma level for outer diameter increased from 1.96 to 4.83.

Prediction of Energy Consumption Indices in the Automotive Industry

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Since the automotive industry is one of the most competitive markets, key players should be capable of evolving their management strategy from a reactive to proactive approach. This way, it is critical for this type of companies to explore a new performance management approach where an effective interaction between the strategic and operational layers should be achieved.

In line with this vision, a framework is presented that helps stakeholders make decisions based on the ability to anticipate future performance behaviours. Using leading indicators as reference, the key idea is to structure and model the existing knowledge within a mathematical tool, in order to project the manufacturing system's behaviour into the future.

In order to show the reliability and importance of this framework, this paper presents a research performed at an automotive plant. The aim is to model the factors affecting energy consumption and thus estimate the future behaviour in terms of sustainability issues.

A Mathematical Framework for Parameter Designing Under the Noise: A Case Study from a Conventional Turning Machine

R.M. Chandima Ratnayake
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In parameter design, the best settings for the control factors that minimize quality loss in a particular manufacturing operation are determined. In this process, it is possible to carry out minimization of the manufacturing cost, showing sensitivity to noise and quality loss with existing wide tolerances on the noise factors, low-grade components and materials. This manuscript proposes a mathematical framework for parameter designing under the existing noise. The mathematical framework has been proposed using the 'parameter design' approach suggested in the robust design approach (RDA). The 'parameter design' focuses on designing a process to make the performance minimally sensitive to the different causes of variation. Use of the framework has been illustrated with a case study, which has been performed using a conventional turning machine. The possibility of improving the quality under the noise due to age-related deterioration of the selected turning machine and the particular manufacturing environment has been demonstrated.

Who Needs to Learn What from Whom? Understanding Quality Management by Differentiating Organisations and Practices

Henrik Eriksson
Chalmers University of Technology, Sweden

The purpose of this paper is to understand quality management by describing differences between organisations and practices. This study looks at the scores for different criteria from the different quality award applicants in Sweden between 1992 and 2010. It is noteworthy to mention that the service industry outperforms the manufacturing industry. Furthermore, and maybe not surprisingly, large organisations are ahead of small and medium enterprises in the race for quality progress. In general, when comparing public with private organisations, private organisations do better, and especially process issues seem to be easier for private firms. This study also suggests that process management as it is described and taught needs to be revised to better fit the organisations. The time has come to question old truths about quality management, especially regarding who is better than whom at what, and who needs to learn what from whom.

A Conceptual Readiness Framework for Statistical Process Control (SPC) Deployment

Sarina Abdul Halim Lim, Jiju Antony
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It is acknowledged that the benefits of statistical process control (SPC) can be accrued not only in the manufacturing industry but also services industry. However, organizations always face challenges and subsequently some of the SPC projects are doomed to fail and cause more financial loss. Many studies have addressed this problem by providing critical success factors (CSFs) as a solution. However, up to this date no study has yet addressed another important component in the successful SPC deployment, which is the readiness level of a company to deploy SPC. The purpose of this paper is to investigate SPC readiness factors and subsequently challenged to develop an SPC readiness framework (SPCRF). A systematic review was applied and resulted nine journal articles. A conceptual framework consists of nine readiness dimensions in SPC deployment were developed based on selected studies and quality awards models.

Session	PP 1 Production Planning & Control (1)
Date	12/11/2013
Time	13:30 - 15:00
Room	Sakthong
Chairs	Suksan Prombanpong, Shijin Wang

A Fuzzy-based Multi-Term Genetic Algorithm for Reentrant Flow Shop Scheduling Problem

I-Hsuan Huang, Shigeru Fujimura
Waseda University, Japan

In semiconductor manufacturing factories, the process of wafer fabrication is the most technologically complex and capital intensive stage. This process is configured as a reentrant flow shop process with many machines and processing steps. It needs an efficient and effective scheduling method for large size process in order to increase the competitiveness. The reentrant flow shop problem (RFSP) means that all jobs have the same route through the shop machines and the same shop machine is used several times to complete a job.

This research provides an effective fuzzy-based multi-term genetic algorithm to solving RFSP with the objective of minimizing the total turn around time (TTAT). The proposed method focuses on the critical point in scheduled solutions. The middle position of longest TAT is defined as the critical point. According to the critical point and current generation, fuzzy logic chooses the focused term of chromosome, then the genetic algorithm effects on this term. In each evolution, only corresponded part of chromosome is evolved by crossover and mutation while other parts of chromosome remain unchanged. Through computational experiments, the effectiveness of the fuzzy-based multi-term genetic algorithm is evaluated.

The Effect of Metal Noise Factor to RFID Location System

Seng Fat Wong, Yi Zheng
University of Macau, Macau

The technology of Radio Frequency Identification is becoming widely used in industry engineering. However, the UHF RFID tag can be easily affected by environmental noise factors, especially on the metal surface. The metal effect to Radio Frequency Identification (RFID) location system is described in this paper. Different methods are adopted to analyze the circumstances when RFID location system is placing near the metal objects. Simulation for tag antenna is accomplished to detect how the metal plate affecting the magnetic field around the tag. Moreover, the experiments are completed by using RF Code M250 reader and R150 tags. The proposed results illustrate the noise factor of metal material influence RFID system and provide the useful alert when RFID technology is applied in the metal environment of industry engineering.

Concept of an Intelligent Production Control for Global Manufacturing in Dynamic Environments Based on Rescheduling

Gisela Lanza, Nicole Stricker, Raphael Moser
Karlsruhe Institute of Technology, Germany

This paper presents an approach towards an innovative and intelligent production control for a highly flexible and efficient production in an increasingly dynamic and complex environment. For this purpose, an approach is developed on the basis of intelligent rescheduling for global manufacturing networks using information of cyber physical systems.

The Effectiveness Evaluation of Job-shop Scheduling based on Theory of Constraints (TOC) Under Demand Variation

Chompoonoot Kasemset, Uttapol Smutkupt, Nichchima Anongjanya
Chiang Mai University, Thailand

This study aims to present the effectiveness evaluation of job-shop scheduling based on TOC concept under demand variation using simulation technique. Two schedule performance measurements under uncertainty, schedule robustness and performance, are used in comparing the performance of schedule based on TOC and traditional method (minimizing Cmax). Simulation test scenarios are carried out by applying different distribution of demand as Poisson and uniform distributions with two case problems as single and double bottlenecks cases. The results show that the schedule based on TOC concept is superior to the schedule from traditional method when demand variation is increased and the production system is more complicated as can be observed from the results of double bottlenecks case.

Task and Worker Assignment in the Shared-Machine U-Shaped Assembly Line

Pattarawan Khemyong, Ronnachai Sirovetnukul
Mahidol University, Thailand

This study presents a new approach on a U-shaped line namely, task and worker (double) assignment in the shared-machine U-shaped assembly line. A case study was done on a garment manufacturing company in Thailand. In order to revolutionize and consider the lean concept of waste reduction and synchronous move, three objective functions were considered: minimizing the number of workstations (workers), minimizing walking time, and maximizing full work. The results showed that the shared-machine U-shaped line has the same number of workstations (or workers) as the straight line and traditional U-line but the walking time is less than the latter while the utilization of worker is satisfying. In addition, the utilization of machine is better than other lines. Hence, the proposed model can help improve the double assignment and increase machine and worker utilization of a manufacturing company.

Investigation of the Information Generated by Technology Management Tools and Links to Strategic Product Planning Stages

Alexander U. Reik, Moritz King, Udo Lindemann
Technische Universität München (TUM), Germany

Linking technology management to the business strategy and the strategic product planning process leads to competitive advantage and offers sustainable success in global markets. Technology management as a cross-departmental function handles a lot of tools for all kinds of purposes. Based on established tools, the paper illustrates the links between the two domains and investigates the information which information is required by product planning as well as which specific tools achieve this.

Session	SM 1 Systems Modeling & Simulation (1)
Date	12/11/2013
Time	15:30 - 17:30
Room	Sakthong
Chairs	Linda Zhang, Balkrishna Eknath Narkhede

Automatic Planning of GPON/FTTH Networks Based on Lagrangian Heuristic Optimization

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Gigabit Passive Optical Network / Fiber To The Home (GPON/FTTH) has been of increasing interest for the broadband access network due to its inherent advantages, such as high bandwidth, immunity against electromagnetic interference, no active components required, and low cost. The planning of GPON, however, is a very difficult and time-consuming task. Many design factors such as the number, types, positions of network elements and routing information, have to be considered. In this paper, an automatic GPON design method is proposed, which models the network planning design as a problem of the form of Binary Integer Programming (BIP). The BIP optimization problem that is in nature a NP-hard problem is solved using a Lagrangian Heuristic algorithm. Experiment results have been given to show the effectiveness of the proposed method to identify the optimal placement of distribution points with lower computational cost in network planning.

Concept for an Integration-framework to Enable the Crossdisciplinary Development of Product-service Systems

Konstantin Kernschmidt¹, Thomas Wolfenstetter¹, Christopher Münzberg¹, Daniel Kammerl¹, Suparna Goswami¹, Udo Lindemann², Helmut Krčmar¹, Birgit Vogel-Heuser¹

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Modern mechatronic Product-Service Systems (PSS), as a combination of mechanics, electrics, electronics, software and services, require an interdisciplinary system understanding and development process. During the development, each discipline uses specific modeling languages and tools, which focus on certain aspects of the system. However, much of the model information is commonly used in the different disciplines involved. Thus, it is inefficient to model these commonly used elements separately from scratch in every discipline and thereby keep the data of the system consistent. Therefore, in this paper a concept for an integration-framework is presented, which defines a specification of the relevant PSS elements and their attributes, in order to facilitate the crossdisciplinary use of model-information during the development process of mechatronic PSS.

Functional Analysis and Modeling of Complex, Evolutionary Grown, Mechatronic Products

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In evolutionary grown mechatronic systems, the involved disciplines are often not sufficiently integrated. For optimization and improvement of this situation, the system and its functional dependencies are modeled. During the steps of defining objects and building up the model, the identification of functional dependencies is challenging. This contribution presents an approach to support these steps in order to improve the quality of the model. It addresses situations and systems, in which documentation and a system overview are not available adequately. Thus a modeling-scheme is developed and the elements are used to build up a Multiple Domain Matrix. The functional dependencies are derived from relations in the domains of "information" and "states". The approach is demonstrated by an example out of industrial context.

Using DSM and MDM Methodologies to Analyze Structural SysML Models

Sebastian Maisenbacher, Konstantin Kernschmidt, Daniel Kasperek, Birgit

Vogel-Heuser, Maik Maurer

Technische Universität München, Germany

Matrices and graph-based representations are commonly used visual models of system structures. Depending on the objective of the observer, both representations offer different opportunities and advantages. A standardized graph-based modeling language is SysML, while the design structure matrix (DSM) and the multiple domain matrix (MDM) are typical matrices used during the development of complex systems. Although both modeling techniques are wide spread, up to now they are hardly used conjointly. In order to utilize the advantages of both approaches and thus, enhance the entire development process this contribution examines the transformation of SysML diagrams to their matrix representation as a DSM or MDM, in order to analyze the models further. The approach is verified on a use case of a product-service system.

Identifying Signs of Systems Fragility: A Crowdsourcing Requirements Case Study

Attila-Peter Toth, Davor Svetinovic

Masdar Institute of Science and Technology, United Arab Emirates

It has long been understood that the initial investment in the requirements engineering process has significant returns in the development of a system. Fragility is present in every system, although there are often no signs indicating its presence in system requirements. One can try to predict the system breakdown based on its behavior, but the true sources are frequently overlooked. The fact that fragility is recognized when it manifests, suggests that it can be triggered, thus there are certain conditions that need to be fulfilled in order to be triggered. We conducted a case study in order to identify signs in the requirements specification that may lead to systems fragility. As the result of this case study, the five signs of fragility were identified and they can be used in a requirements engineering process to elicit fragility requirements and potential antifragility.

Determining Optimal Zone Boundaries for Three-Class-Based Puzzle-Based Compact Storage Systems

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²The University of Science and Technology of China, China

Thanks to their advantages, such as high storage density and short response time to customers' requests, puzzle-based compact storage systems have been increasingly installed in warehouses and distribution centers recently. This study addresses zone boundary optimization for puzzle-based compact storage systems when a three class-based storage policy is implemented, in attempting to facilitate system design. We first identify 3 cases, where a puzzle-based compact storage system can be divided into 3 zones for items classified as A, B, and C classes. Subsequently, we derive the system expected response time and further develop a mix-integer nonlinear model to optimize zone boundaries by minimizing the derived response time. At last, in view of the problem complexity, we reformulate the zone boundary optimization model as a dynamic programming model, and solve it accordingly. As shown by the numerical example, although the solution procedure is relatively complex, the results can be applied in practice in a straightforward way. In addition, in comparison with randomized and two-class-based storage policies, three-class-based policy can significantly reduce response time of puzzle-based compact storage systems.

Session	EE 1 Engineering Economy & Cost Analysis (1)
Date	12/11/2013
Time	13:30 - 15:00
Room	Patumchard
Chairs	Md. Mamun Habib

The Cost and Benefit Analysis of Taiwan High Speed Railway - With Sustainable Perspectives

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Taiwan High Speed Railway (THSR) with USD16.5 billions initial investment, is the biggest build-operation-transfer project ever since in Taiwan. THSR changed the life style a lot in Taiwan. It carries passengers from Taipei (the northern part of Taiwan) to Kaohsiung (the southern part of Taiwan) within 90 minutes with speed of 300 kilo meters per hour. This study focuses on analyzing its performance with sustainable perspectives. We also monetize the benefits, such as the travel time saved, energy resource saved, pollution reduced, and accident rate decreased which THSR brought and will bring for Taiwan. The conclusion is that THSR could still prove itself to be worthy of construction, with good performance in the overall concession period.

Reducing Investment Costs in Multi-Variant Mass Production

Achim Kampker, Heiner Hans Heimes, Stefan Bickert, Timon Rodenhauer
Laboratory for Machine Tools and Production Engineering (WZL), RWTH Aachen University, Germany

Short product life cycles and a high variance within product generations continue to pose major challenges for manufacturing companies. Especially in highly automated mass production, one central question is how to deal with different specifications of product variants during the manufacturing process. Since a large product variety is usually associated with high investment costs, we present a methodical approach addressing the systematic reduction of machine investment in multi-variant production. The procedure is universally applicable to various industries and forms the basis for the development of an integrated construction kit for products and production processes.

Considerations for Commoditization Factors in Flat-Screen TV Industry

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Price declining factors of flat-screen TV with a focus on LCD TV are analyzed from two different aspects in terms of commoditization: Aspect of company's product development such as adoption ratio of self-manufactured panels and offshore production ratio and aspect of LCD panel industry growth. It was confirmed that product development has impact on price decline and that there is a strong relationship between LCD panel production capability and LCD TV price decline. Considering these analysis results, it is believed that modularization and Japanese manufacturers' offshore production have led to global competition and production volume has increased due to active investment on LCD industry, which resulted in price competition and commoditization. In light of all this, there are some implications for Japanese manufacturers: First one is whether or not products can continually provide differentiated values and second is to implement adequate development strategies to internally retain product collaboration process technology.

A Parametric Cost Estimation Model to Develop Prototype of Electric Vehicle based on Activity-Based Costing

Rakhman Ardiansyah, Wahyudi Sutopo, Muhammad Nizam

Sebelas Maret University, Indonesia

Accurate estimation is still challenging for the development stage of a product due to lack information about the production process, bill of material, and detailed activity. Parametric cost estimation based on activity-based costing can be used to generate the cost information of the whole process from the design stage until development stage. This paper presents a parametric cost estimation model that links activity-based costing to enhance accuracy of estimation for developing an electric vehicle prototype. The parametric cost represents the development process of a prototype consisting of four main processes. It also presents activities, cost center, and cost driver in each process. The total cost of each cost center is formulated by mathematical equations. A prototype of the Sebelas Maret Electric Vehicle is chosen as a case study. The proposed model can be utilized to predict total cost estimation the prototype of electric vehicle. This estimation method can influence cost reduction of developmental stage.

Software Test Estimation Tools using Use Cases and Functions

Shaiful Islam, Bishwajit Banik Pathik, Manzur H. Khan, Md. Mamun Habib
American International University - Bangladesh (AIUB), Bangladesh

This paper demonstrates the software test estimation tool, which is clearly defined to understand, that provides the time and cost of any software test project. There are different estimation tools for software development process [8] and those are well recognized. But there are lacks of standard tools for estimation of Software Test phase. Therefore, the researchers applied that tool on two projects, project 1 - Management Accounts Consolidation System for Line Director and project 2 - Persona, in order to determine the time and cost of those projects. Since few software test estimation tools are available in the market, however, this paper would be fruitful for the software industry to explore the time and cost of any real software test project.

Session	PM 1 Project Management (1)
Date	12/11/2013
Time	15:30 - 17:30
Room	Patumchard
Chairs	Leon Pretorius, Egon Mueller

Optimal Scheduling of Work-Content-Constrained Projects

Philipp Baumann, Norbert Trautmann
University of Bern, Switzerland

The execution of a project requires resources that are generally scarce. Classical approaches to resource allocation assume that the usage of these resources by an individual project activity is constant during the execution of that activity; in practice, however, the project manager may vary resource usage over time within prescribed bounds. This variation gives rise to the project scheduling problem which consists in allocating the scarce resources to the project activities over time such that the project duration is minimized, the total number of resource units allocated equals the prescribed work content of each activity, and various work-content-related constraints are met.

We formulate this problem for the first time as a mixed-integer linear program. Our computational results for a standard test set from the literature indicate that this model outperforms the state-of-the-art solution methods for this problem.

Solving a New Mixed Integer Non-linear Programming Model of the Multi-Skilled Project Scheduling Problem Considering Learning and Forgetting Effect on the Employee Efficiency

Erfan Mehmanchi, Shahram Shadrokh
Sharif University of Technology, Iran

In this paper, we propose a new mathematical programming model to tackle the multi-skilled project scheduling problem. Considering the effect of learning and forgetting on the human skills, an exponential learning function has been developed by assuming the efficiency of employees performing activities to be dynamic. Taking the nonlinearity of the function into account, we use separable programming to acquire an appropriate linear approximation for it. Moreover, the proposed model allows us to relax some of the binary variables linearly without any modifications. At the end, the final model is tested with some instances and is solved by CPLEX in order to confirm the implemented simplifications and linear approximation. After examination of the results and checking the constraints, the validity of the model and its modifications have been approved. Regarding NP-hardness of the MSPSP, this process can be a prominent step for developing metaheuristic algorithms to solve real world problems.

An Empirical Study of Critical Success Factors of Project Governance in China

Wenwen Xiang, Ying Li, Yongyi Shou
Zhejiang University, China

It is important to have a better understanding of "what is effective project governance" and "how to govern the project effectively". The paper aims to clarify the definition of project governance, identify the effective project governance standards, and explore critical success factors based on project governance models. A questionnaire survey was conducted in China and a list of critical success factors of project governance was quantitatively prioritized. The empirical results indicated that stakeholder management is the most important factor of project governance success, which provides a reference for further research and project practice.

Elimination of Waste Through Value Add/Non Value Add Process Analysis To Improve Cost Productivity in Manufacturing - A Case Study

Kam-Choi Ng¹, Chun Pei Lim¹, Kuan Eng Chong², Gerald Guan Gan Goh³

¹*Infineon Technologies, Malaysia*

²*Technical University Malaysia, Malaysia*

³*Multimedia University, Malaysia*

Value Stream Mapping (VSM) is a very comprehensive tool that allows an organization to identify sources of waste and implements process improvements. This paper describes the adoption of VSM in a semiconductor manufacturing company to improve personnel efficiency and optimize headcount in the production lines. Based on the future state of the value stream mapping a new production process flow was implemented. Non value added activities were reduced or removed by assigning butterfly operators to perform these tasks. The new system successfully resulted in the reduction of six headcounts in the taping process. This is equivalent to a saving of approximately eighty seven thousand Malaysian ringgits per annum. This systematic approach can be similarly employed by the lean practitioners to conduct lean activities in other manufacturing sectors.

Schedule Risk Analysis in Construction Project Using RFMEA and Bayesian Networks: the Cali-colombia Case Study

Camilo Andres Mican Rincon¹, Víctor Javier Jimenez¹, Jessica Perez², Alejandro Borrero³

¹*Universidad del Valle, Colombia*

²*Vatia, Colombia*

³*Cooomeva, Colombia*

The projects in the construction sector are developed in complex and dynamic circumstances due to uncertainties and risks. The schedule risk is the probability that the project exceeds the initial programing, for which several methodologies are proposed; on the other hand very few of them have been used in countries where the economies are in development. This paper presents a case study of the construction industry in the city of Cali - Colombia, integrating the RMFEA prioritization method and the Bayesian Networks model for the schedule risk analysis in construction projects. It will be possible to identify the main own risks in this type of projects and the impact that they have in the probability of finishing the project on time.

Fuzzy Decision Model for Construction Contractor's Selection in Egypt: Tender Phase

Hossam Hassaan, Nashaat Fors, Mostafa Shehata

University of Alexandria, Egypt

Selecting an appropriate contractor is essential for the success of any construction project. A tender procedure should facilitate selection of a reliable contractor taking into consideration many criteria. This paper presents a systematic prequalification and performance procedure, based on multi criteria decision making (MCDM) that is Analytical Hierarchy Process(AHP) with Fuzzy Set Theory. This process uses an algorithm to handle the inconsistencies in the fuzzy preference relation when pair-wise comparison judgments are used with linguistic assessment or exact assessment of performance of the contractors on qualitative or quantitative criterion, respectively. A questionnaire survey was conducted, containing 34 factors affecting cost estimation for contractor selection during tender decision. Finally, a real case study and an application example for a contractor selection problem were provided to the construction industry to demonstrate the implementation process of the proposed method.

Session	EB 1 E-Business & E-Commerce (1)
Date	12/11/2013
Time	13:30 - 15:00
Room	Satabud
Chairs	Michel Aldanondo, Antonio Grilo

Internet Usage Trend and Postal Service Performance in Australia

Sung Shim¹, Arun Kumar², Hasan Hakami²

¹Seton Hall University, United States

²Royal Melbourne Institute of Technology (RMIT), Australia

This study examines several important factors of Internet usage and postal service performance in Australia from 2006 to 2010, using data from secondary sources. The results on Internet usage indicate increasing trends in domain name registrations, Internet user population, Internet usage duration, and e-commerce value. On the other hand, the results on postal service performance show stagnating trends in mail volumes, revenue, pre-tax profit, rate of return, and labor productivity growth during the same period. While we need more data to investigate systematically any causal relationships between the factors of Internet usage and those of postal service performance, the results taken together suggest that the increasing trend of Internet usage had some negative impacts on postal service performance. This study is expected to help understand the trends of Internet usage as associated with the performance of postal service and set the stage for the future of postal service in Australia and other countries.

Measuring the Performance of Viral Marketing based on the Dynamic Behavior of Social Networks

Atikhom Siri, Trasapong Thaipathump

Chiang Mai University, Thailand

Recently the demand for using social networks to advertise has increased significantly, and viral marketing on social media has; therefore, become an effective approach when wishing to disseminate product advertisements, for it can help match customers to products more effectively than conventional marketing methods. This study measures the effectiveness of information dissemination within a dynamic behavior environment, and the model used here attempts to analyze the actual performance of viral marketing campaigns. Several factors impact upon the effectiveness of viral marketing, and according to the findings of this study, these factors not only include the number of generations to reach the target customers, but also the individual parameters and social parameters set for the customer segments, such as the number and level of friends with a shared interest in the same product. This study; therefore, also focuses on the significance of these factors, so as to analyze their impact on customers' product selection decisions, and help develop the most effective advertising campaigns when using social networks for a given target group.

Mobile Stock Trading (MST) and its Social Impact: A Case Study in Hong Kong

Kin Meng Sam¹, Chris Chatwin², Iat Cheng Ma¹

¹University of Macau, China

²University of Sussex, United Kingdom

Smartphones are becoming the mainstream mobile devices used by Hong Kong residents. The popularity of smartphones has led to the emergence of a new way of trading in financial securities and products – so called: mobile stock trading. This new technology has several attractive features that have driven this new market forward. Investors can place orders at anytime and anywhere without any geographic restriction as long as they can access the internet. By using the Diffusion of Innovation model (DOI) and related literature, we found that three factors: perceived usefulness, trialability and observability - contribute to the determination of customer attitudes in adopting mobile stock trading. The results revealed practical implications for the future development and implementation of mobile stock trading.

How Sense Qualities Influence User Preference of E-commerce Website

Dunxing Wang¹, Junxiu Zhang²

¹Tsinghua University, China

²Northeastern University, China

The objective of this study was to investigate the relationship between sense qualities and overall preference in interface design of E-commerce website based on users' perceptual demand. First, the semantic differential method was adopted to extract sentimental evaluation phrases of E-commerce website's interface. Then, an evaluation scale investigating users' sense qualities of E-commerce website interface was developed, which was also checked to be valid in this field. After that, multiple linear regression models of the relationship between sentimental evaluation phrases and users' emotional preference and also the relationship between evaluation factors and emotional preference of E-commerce website's interface were established respectively, which quantified the emotional dimensions of interface design of E-commerce website. Eventually, some random samples of E-commerce website's interface were taken to test the effectiveness of models above and implications of this study were discussed.

Research on Product Common Attribute Model with Consumption Value Theory Applied in Food industry

Tsung-Yi Chen¹, Yan-Chen Liu², Yuh-Min Chen²

¹Nanhua University, Taiwan

²National Cheng Kung University, Taiwan

Knowing why consumers choose their favorite products can help enterprises to stay ahead of market trends and thereby increase profits and reduce losses. There are various theories which attempt to explain what happens in the minds of consumers when they purchase a product. However, methods of applying these theories to an enterprise are needed but are rarely discussed in the literature even though having a practical method of understanding consumer thinking would help enterprises understand those proposed theories easily. In this study, we propose a Product Common Attribute (PCA) model and provide quantified values to help enterprises to apply consumption value theory to their products. Because it is difficult to quantify each value index of a consumption value theory, the PCA model is proposed to correspond to the five value indices of consumption value theory, incorporating a questionnaire survey to verify the corresponding relationships. Consequently, this study quantifies and applies the relationship between the PCA model and consumption value theory.

Incorporating Location, Routing and Inventory Decisions in Dual Sales Channel - A Hybrid Genetic Approach

Chia-lin Hsieh¹, Shu-hsien Liao², Wei-chung Ho²

¹Aletheia University, Taiwan

²Tamkang University, Taiwan

In this study, we present a three-echelon dual sale channel supply chain network including a single vender, multiple distribution centers (DCs), also physical retailers and online customers. In the proposed business model, the vender receives orders either from physical retailers or online customers, then assigns specific DCs to fulfill these orders. The purpose of this problem is to determine the number and locations of DCs which assign both physical retailers and online customers. These decisions are very critical policy that the vender is responsible for managing inventory replenishment at specific DCs. Since the formulated problem is consisting of LIP (Location-Inventory Problem) and LRP (Location-Routing Problem) issues, we develop a genetic algorithm by incorporating a three-phase heuristic approach to solve both LIP and LRP. The experimental results demonstrate trade-off cost relations which impact on the number of potential DCs to be opened under the objective of minimizing total supply chain cost.

Session	RM 1 Reliability & Maintenance Engineering (1)
Date	12/11/2013
Time	15:30 - 17:30
Room	Satabud
Chairs	David Coit, Yoshinobu Tamura

Product Support Logistics Based on System Reliability Characteristics and Operating Environment

Behzad Ghodrati, Alireza Ahmadi
Luleå University of Technology, Sweden

The environmental conditions in which the equipment is to be operated, such as temperature, humidity, dust, operators' skill, etc, often have considerable influence directly on the product reliability and indirectly on the product supportability characteristics. This paper, after discussing the factors influencing product reliability, describes a method to estimate spare part requirements based on estimation of the actual reliability of a product under the influence of the product-operating environment using a proportional hazard model. In this research only non-repairable components/parts in repairable systems are studied. Results express a considerable difference between considering and ignoring the operating environmental factor on system performance. So, this factor should be seriously considered while dimensioning product support and service delivery performance strategies, since it will have an impact on operation, maintenance and service quality.

Reliability Analysis Based on Network Traffic for a Mobile Computing

Yoshinobu Tamura¹, Shigeru Yamada²
¹Yamaguchi University, Japan
²Tottori University, Japan

Third-party software development paradigm has been gaining a lot of attention in various software development area, i.e., Android, OpenStack, and Apache HTTP server, etc. However, the poor handling of quality problem and customer support prohibit the progress of OSS (open source software) developed under the third-party software development. Therefore, many companies have been hesitant to innovate the OSS, because an OSS includes several software versions. In particular, the installer software developed under the third-party developers indirectly has an effect on the reliability in area of a mobile device. In this paper, we develop an integrated method of reliability assessment considering the software failure and network traffic based on a hazard rate model and neural network for the mobile device. In particular, we analyze actual software failure occurrence time data to show numerical examples of software reliability/portability assessment for the mobile device.

Interval Estimations of Software Reliability and Optimal Release Time Based on Better Bootstrap Confidence Intervals

Shinji Inoue, Shigeru Yamada
Tottori University, Japan

We discuss a bootstrap method for estimating software reliability and cost-optimal software release time by using a discretized software reliability growth model. And then, we conduct interval estimations of them by five types of bootstrap confidence interval estimation methods including so-called better bootstrap confidence intervals, such as a bootstrap-t and a bias-corrected and the accelerated confidence interval (BCa) method. In our numerical examples, we confirm that our bootstrap approach yields simulation-based probability distributions of model parameters, software reliability assessment measures, and cost-optimal software release time without deriving these probability distributions analytically.

Production Reliability Evaluation of Continuum-State Manufacturing System Based on Universal Generating Function

Fen Kuang, Wei Dai, Yu Zhao
Beihang University, China

Production reliability is an integrated measurement of production ability of the continuum-state manufacturing system (CSMS), which is determined by the state of each process within. Based on the general stress strength interference theory, a new model is proposed for production reliability evaluation of CSMS, which can calculate the system capacity under variable production tasks, together with the degradation of production capacity caused by the degradation of equipment has also been considered. The universal generating function is used to develop the model and procedure to evaluate the CSMS reliability. Case study of the servo valve process system is presented, the production reliability and the corresponding production reserves for equipment and system over time are provided.

Multi-Response Surface Optimization Using Axiomatic Design

Vijay Rathod¹, Om Prakash Yadav², Ajay Pal Singh Rathore³
¹Government Polytechnic Mumbai, India
²North Dakota State University, United States
³Malaviya National Institute of Technology, India

An integration of axiomatic design and response surface methodology (RSM)-based robust design can provide an effective approach for simultaneously optimizing multiple conflicting quality characteristics. This paper proposes a robust multi-response surface optimization (MRSO) method by integrating axiomatic design approach with Dual RSM-based robust design optimization model to minimize the interaction among the multiple quality characteristics. The applicability of the proposed MRSO methodology is demonstrated using suitable examples.

Accelerated Life Tests for Data Acquisition Devices used in Smart Grids

Lijuan Shen¹, Xuan Liu¹, Zhi-Sheng Ye²
¹China Electric Power Research Institute, China
²The Hong Kong Polytechnic University, Hong Kong SAR

The data acquisition devices play an important role in modern Advanced Metering Infrastructure and smart grid energy systems. Accelerated life tests are used to obtain the failure data of the device in a timely fashion. In order to analyze the data, we develop a statistical inference procedure to analyze ALT data with multiple stress factors and multiple failure modes. This procedure is likelihood-based. We then apply the procedure to analyze the ALT data of the device, which has two stress factors and two failure modes. Based on the analysis, the failure time distribution under normal use conditions can be effectively estimated.

Session	SR 1 Safety, Security & Risk Management (1)
Date	12/11/2013
Time	13:30 - 15:00
Room	Boontarik
Chairs	Paolo Trucco, Xiuzhu Gu

Resilience of Transport Systems Under Disaster: Simulation-based Analysis of 2011 Tsunami in Japan

Paolo Trucco¹, Nobuaki Minato², Nicola Careri¹

¹Politecnico di Milano, Italy

²Keio University, Japan

Improving infrastructural systems' resilience to limit consequences of catastrophic and disruptive events is a major concern for policy makers and private operators. The aim of this work, developed within an international research project named Collaboration Management of Airports at Catastrophe (CMAC), is to capitalize on what the dramatic experience of March 2011 tsunami in Japan demonstrated. In particular the Yamagata airport case study was examined by means of a discrete events simulation model that represents the Yamagata airport and the related ground regional transportation system, and describes in great detail operational aspects and management dimensions of the system. To provide transport system managers and policy makers with a diagnostic and decision support tool, a simulation campaign was conducted to map all the critical resources and analyze their contribution to the resilience performance of the system.

A Study of Semiconductor Industry Accidents: Making Predictions Based on BP Artificial Neural Networks

Chao Liu, Hsuan Peichen, Wu Jianping

Semiconductor Manufacture International Corporation, China

This paper puts forward using BP artificial neural network to forecast semiconductor industry accidents, using optimized and quantifiable impact factors of accidents as input nodes and accident quantity as the output node. The established predictive model has 7 input parameters and 1 output parameter. This paper uses this model to predict and validate the accident occurrence circumstances of a semiconductor company and gets accurate results.

Estimating Reporting Culture and Its Link to Safety Performance by Applying Hemodialysis Error Taxonomy

Xiuzhu Gu, Kenji Itoh

Tokyo Institute of Technology, Japan

This paper reports a hemodialysis error taxonomy system for not only providing a framework to analyze characteristics of hemodialysis incidents, but also estimating safety status in a dialysis organization. The error taxonomy system was developed by adapting a common health care error taxonomy system to hemodialysis situations. Based on the results of its application to 1,909 incident reports collecting from two dialysis facilities, we obtained a plausible link between reporting culture – which was estimated by average descriptive depth – and safety performance, for which we introduced two indices, i.e., rate of near miss reporting and rate of adverse event reporting. Thus, the error taxonomy system for hemodialysis events proposed in this paper well demonstrated its ability for predicting safety status in a specific dialysis organization.

Risk Profiling in Asymmetric Warfare through Intelligent Analysis of Images and Neural Networks

Prem K Kalra, Rajkumar Vishwakarma

Indian Institute of Technology Delhi, India

Security agencies across the world are facing major challenge from the left-wing extremism and terrorism. Terrorists plan to create liberated zones by forming guerrilla squads. They plant IEDs to stop movement of security forces. Forces due to the inadequacy of traditional tools and techniques, un-familiar terrain, lack of knowledge of local language are struggling hard to get an upper hand over the militia, while launching various operations. In 2010, 132 police officers lost their lives in these operations. In order to overcome these shortcomings, in this paper, digital image analysis and neural networks have been used to predict risk profile of an area which acts as alert to security forces conducting operations. Before conducting any CASO or Ambush, troops undertake operational-planning based on terrain features, intelligence inputs and risk profile of the area. These tools have been very useful in reduction of number of losses to 26 police officers in 2011.

Merging Habitus into Safety Risk Management: A Case from the U.S. Construction Industry

Dong Zhao

Virginia Tech, United States

Construction industry has been continuously suffering the safety risks and injuries. According to the U.S. Department of Labor, 19.4% of nationwide workplace fatal injury occurred in construction between 2003 and 2011. Technical efforts have been directly endeavored to impact safe working performance but most shown as less effective. This research aims to find out an appropriate method to actively merge modern technology and safety culture into the safety risk management. A safety issue of electrical hazard from the U.S. construction industry was selected for case study. Based on the analysis of the electrical safety risk in construction, it is found that a large portion of fatalities and injuries are related to workers' unsafe acts and lack of awareness. An innovative method is proposed that merges safe habitus into the risk management through information technology. An application which adopts this method is also demonstrated.

Relationship Between Working Postures and MSD in Different Body Regions Among Electronics Assembly Workers in Malaysia

Roseni Abdul Aziz¹, Mat Rebi Abdul Rani², Jafri Mohd Rohani², Ademola

James Adeyemi², Nurlyana Omar¹

¹National Institute of Occupational Safety and Health (NIOSH), Malaysia

²Universiti Teknologi Malaysia, Malaysia

This paper is aimed at investigating the effect of working posture on the prevalence of MSD in different body regions among electronic assembly workers in Malaysia. The participants included 78 males and 105 females, mostly aged between 20 to 40 years. Demographic information was supplied in a questionnaire and the frequency and intensity of pain or discomfort were indicated on a body map. Posture and gender were significantly associated as most male worked standing whereas female took to sitting. There was also significant difference in reported pain and discomfort among the sitting and standing workers in the entire body region except in the upper trunk area of the neck, shoulder and upper back. There is the need for the various organisations to factor these findings into their considerations for the provision of facilities that will ensure maximal comfort of the workers.

Session	GM Global Manufacturing & Management
Date	12/11/2013
Time	15:30 - 17:30
Room	Boontarik
Chairs	Yan-Ru Li

The Use of Improvement Tools: a Comparison Between Sectors and Industries

Dotun Adebajo¹, Matthew Tickle², Frank Ojadi³, Robin Mann⁴

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²University of Liverpool, United Kingdom

³University of Lagos, Nigeria

⁴Massey University, New Zealand

This study explores the use of improvement tools between public and private sector and manufacturing and service organizations. In total 453 organizations across 8 different countries responded to a questionnaire with the data being analyzed through use of the IBM SPSS Statistics software package. The results revealed a number of differences between the sectors and industries as well as similarities between the public sector and the private sector and between the service industry and the manufacturing industry.

The Impact of Absorptive Capacity on Post-Acquisition Financial Performance: The European ICT Data

Mait Rungi, Valeria Stulova

Tallinn University of Technology, Estonia

Absorptive capacity refers to a firm's ability to utilize external knowledge for commercial purposes. Ability to capture externally generated information is crucial in contemporary world, where competition is high and new product lifecycle short - signifying the importance of constant learning and openness. The current study investigates the impact of absorptive capacity on financial performance in the context of corporate acquisitions. A quantitative re-search was carried out based on European ICT companies that were subject to acquisition in 2008. The results demonstrate that absorptive capacity entails a direct effect on financial performance.

Efficient Optimization Methods for Extended Flow Path Design

Julie Rubaszewski¹, Alice Yalaoui¹, Lionel Amodeo¹, Sylvain Fuchs²

¹Université de Technologie de Troyes, France

²ANDRA, France

Determination of the direction of each segment of a network and the choice and the paths that will be used by vehicles in production units is called flow path design problem. Roads organization directly influences the performance of the system. That is why this problem is one of the most important issues in designing an AGV (automated guided vehicles) system. Efficient optimization methods based on iterative local search and hybridized ant colony optimization are developed in order to solve a flow path design problem for a conventional unidirectional network and some extensions as different types of vehicles, some segments forbidden and construction costs. We are in interest with the case of minimizing the total travel distance considering both loaded and empty travels. In order to ensure the efficiency of the proposed optimization methods, computational experiments are carried out based on literature example.

Motivations and Criteria for Partner Selection in Innovation Alliance

Xiao-li Chen, Ralph Riedel, Egon Mueller

Chemnitz University of Technology, Germany

Partner selection is of great importance for the viability of innovation alliance. In this paper, based on the scenario that the emphasis of partner selection would vary according to different motivations, different clusters of motivations are worked out and also a criterion system is set up. Based on this, relationships between motivations and selection criteria are clearly identified, which aims to shed some light on the theory of partner selection. A survey based on the experience of companies was further conducted for the analysis. In the end, the criterion system of this work was confirmed to hold high reliable properties and the hypotheses regarding the inner dependence between motivations and the focus of selection criteria could also be proved. With the survey, it was also possible to reveal motivation differences between companies from Germany and China. Furthermore suggestions are given out regarding their criterion focus.

Industry Clusters and Business Ecosystems- The Smart Mobile Industry in Taiwan

Yan-Ru Li, Wen-Zhe Yang

Aletheia University, Taiwan

Cluster has been used by the government and multiple industries to facilitate business growth for decades, but information telecommunication technology and global integration of the supply chain have challenged competition. The business ecosystem links the stakeholders and their subsidiaries around the world beyond geographic location of industrial clusters. The best practice of smart phone companies establishes business ecosystem growth with its supply chain members. However, a number of studies have been conducted using the major platform leaders as subjects. We argue the phenomena of followers' and the supply chains' roles in the business system. This paper uses case study to analyze Apple, Samsung, and HTC with their Taiwanese supply chain companies based on 90 supply companies and 285 factories. Research suggests that smart phone companies intend to link global resources to replace regional clusters, heterogeneous integration to replace technology related companies, and cooperation-competition to replace traditional growth strategies. The research findings reflect that globalization and technology are challenging the industry cluster, which is based on geographic proximity. This may also change the regional sectoral agglomeration policy.

Linkages Influencing NPD-SCM Alignment - Evidence from Indian Automotive Industry

Ankur Pareek¹, Ajay Pal Singh Rathore², Rakesh Jain²

¹Government Engineering College, Ajmer, India

²Malaviya National Institute of Technology, India

New product development and supply chain management activities have become important for success of an organization. Better results are expected when the two activities are aligned with each other. This paper attempts to analyze the NPD-SCM alignment in an Indian automotive firm using case study approach. Five key linkages affecting the alignment have been identified from review of relevant literature. Since these linkages may exhibit inter-dependence, analytic network process (ANP) is used to find out their relative contribution in improving NPD-SCM alignment in the selected firm. Results indicate that voice of customer (VOC), modularity, supply chain responsiveness (SCR), and early supplier involvement (ESI) are important contributors towards NPD-SCM alignment. Results have been discussed with company executives for drawing insights to explore possible reasons. The paper finally concludes by providing few potential directions for future work.

Session	Poster Session 1
Date	12/11/2013
Time	15:00 - 15:30
Room	Krisana

Comparison of the Predetermined Time Systems MTM-1 and BasicMOST in Assembly Production

Marek Bures¹, Pavlina Pivodova²
¹University of West Bohemia, Czech Republic
²Tomas Bata University, Czech Republic

This paper focuses on predetermined time systems and their mutual comparison. For comparison of the methods experimental research and conditions of real assembly production were used. The main goal of the paper is demonstration of reliability, mutual accuracy and deviations of individual methods. A hypothesis needed for verification was stated, that individual methods should have accuracy deviation between 5% to 10%. Findings about time demands for analysis when using chosen methods was a partial goal of our research. For mutual comparison MTM-1 and BasicMOST methods were selected.

Cyclic Production for Robotic Cells Served by Multi-function Robots with Resumable Processing Regime

Mehdi Foumani, Yousef Ibrahim, Indra Gunawan
 Monash University, Australia

This paper addresses the problem of finding the optimal robot move cycle to minimise the cycle time of twomachine cells. The earlier robot's function was mainly moving parts between machines in a manufacturing process. We lift this assumption on robot tasks and assumed a special robot, namely multi-function, which performs a unique operation in transit. This robot starts performing this operation after unloading a part from input buffer and finishes it before loading the part to the output buffer. The processing mode on robot is "stop resume". Thus, regardless of the gap interrupts during the operation, the robot continues processing on part when it is reloaded to the robot without any loss in time. The focus of this study is on one-unit cycles since they are very popular in industry. The cycle time of two possible one-unit cycles is obtained, and the optimality condition of them is determined.

Study on Design Change Review for Small and Medium-sized Enterprises

Xiaonan Yu, Zhibing Yang, Guoxin Wang, Jiping Lu
 Beijing Institute of Technology, China

Inadequate engineering change control method for Small and Medium-Sized Enterprises comparing to Large and Medium-Sized Enterprises, the model of engineering change management for SMEs is established, as well as its goal controlling source of engineering change and the main body reviewing design change. Three evaluation indexes are analyzed, constructing judgment matrix through method of the nine proportional scale, then proposing design changes review method which needed relevant departments to participate in decision-making. In this way, it can expose the problems early that may occur in the late change and reduce the repeated change caused by related change, so saving the cost of change, controlling engineering change of SMEs and improving its management level.

Load Forecasting Assessment using SARIMA Model and Fuzzy Inductive Reasoning

Nestor Gonzalez Cabrera¹, Guillermo Gutierrez², Esteban Gil³
¹Instituto Tecnológico Superior de Irapuato, Mexico
²Instituto Tecnológico de Morelia, Mexico
³Universidad Técnica Federico Santa María, Chile

Accurate load forecasting is critical for power systems planning, control, and operation. Poor forecasting in volatile power markets can have large, detrimental impacts on power system costs and real-time energy acquisition costs from distribution companies. This paper implements and compares two different methodologies for short term load forecasting: a classic statistical model (SARIMA model) and a model based on artificial intelligence (Fuzzy Inductive Reasoning, or FIR, model). A numerical example predicts one week for every methodology and the results are compared for both models.

The Evaluation Model for Cooperate Social Responsibility from a Management Flexibility Perspective

Tyrone T. Lin, Tai-Chi Huang
 National Dong Hwa University, Taiwan

As corporate social responsibility standards become higher, this paper explores how international companies maximize the profits of shareholders and the interests of the community to meet increasingly stringent corporate social responsibility expectations. This paper uses a

real options approach to evaluate the companies with corporate social responsibility before and after the change of cash flows. In this paper, we use the global 100 index as the decision variable of this model. It offers a mathematic model to find the value of threshold. It suggests that managers want to strike whether a decision threshold value should be taken when the decision interval for making the decision is more objective.

A Green Logistics Evaluation Model with Real Options Approach

Tyrone T. Lin, Yu-Shyuan Lu
 National Dong Hwa University, Taiwan

This paper provides a general model for the enterprises that want to execute reverse logistics. The enterprises executing a green strategy can bring the benefit of green goodwill and customer identification. Otherwise, the real profit of executing green reverse logistics is the key point to managers. The authors use the static analytic tool the net present value method to evaluate the relevant costs and prices whenever enterprises execute green reverse logistics in the previous paper (Lin and Lu, (2012)). To enhance the effective management, this paper promotes not only the static tool but also the measurement tool of project activity the real options approach to get the point of executing green reverse logistics and clarify the feasibility of green reverse logistics. By combining the practical and academic analyses, this paper can enhance managers with the solving proposal model to get the balance of green costs and profits.

A Study On The Statistical Comparison Methods for Engineering Applications

Serena Ji, Randy Kang, Lisa Yu, Weiting Kary Chien
 Semiconductor Manufacturing International Corporation, China

In this paper, we introduce a data comparison method, Matching Rule (MR). By setting up a relation between MR and F/T, an empirical criterion of MR for comparing two groups of data is defined. It is based on a study on the classical statistic method "Hypothesis test - F/T". The F/T test is widely used to compare variations & means of two normal populations. However, the empirical criteria of MR do not consider type I error. To make MR truly useful, we develop a program to simulate the sample size needed for the two groups at different levels of type I error. Then MR criteria and the minimal sample size can be determined based on the required type I error. Our simulation results show that the type I error of MR can approach to the traditional F/T test method when sample size is close to 30. With a large sampling size, MR tool is more useful for engineering application than statistical comparison test [1].

The Research of Online Shopping Evaluation Based on Grey Linguistic Multiple Criteria Decision Making System

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²Guangdong University of Finance and Economics, China

Online shopping is making purchasing decisions based on the evaluations from previous buyers. As there are few evaluations based on the existing evaluation criterion and no requirements on the evaluators, the evaluation result may not reflect the real situation fairly. By using gray language instead of the traditional evaluation, this paper establishes a multi-criterion decision-making model, providing the online shoppers with decision-making support. Through relevant data experiment, it is confirmed that the evaluations by grey language can be much fairer. In the future, the researchers can embed this model into the online-shopping recommendation system to facilitate the shopping retrieval.

A Fuzzy Simulated Evolution Algorithm for Multi-Objective Homecare Worker Scheduling

Michael Mutingi, Charles Mbohwa
 University of Johannesburg, South Africa

Due to ever-growing need for satisfactory homecare services in every society, development of efficient staff scheduling methods is crucial. Homecare services are aimed at providing medical, paramedical and social aid to patients at their own homes, leading to reduced hospitalization and healthcare operations costs in the medium to long term. However, the homecare staff scheduling problem is a complex one as it combines the hard vehicle routing and the staff assignment problems. This research presents a fuzzy simulated evolution algorithm, based on fuzzy evaluation, to address staff planning and scheduling in a home care environment. The objective is to decide (i) which patients to assign to each staff, and (ii) the best route or trip for each worker to execute the healthcare tasks, to satisfy the time window preferences of the patients. Results on illustrative experiments presented show that the approach is promising.

Reliable Cooperative and Backup Covering in Disaster Situations

Ladan Hazrati Ashtiani¹, Mehdi Seifbarghy¹, Mahdi Bashiri²

¹Alzahra University, Iran

²Shahed University, Iran

This paper addresses a reliable facility location problem in which the possibility of facility disruption is considered. There are two types of candidate sites which differ from the reliability aspects. A combination of cooperative and backup coverage concepts are considered. It is assumed that customers can be covered by a combination of reliable and unreliable emergency centers in their primal coverage. Backup coverage is also considered for demands in which primal coverage is provided by unreliable centers. The proposed model aims to minimize the total costs, including fixed and expected transportation costs. The nonlinear formulation is resulted and is linearized by the necessary constraints. In addition, the abovementioned problem is solved by the GAMS optimization software, using a number of generated examples in order to demonstrate the performance of the model.

A Framework for the Choice of the Opportunistic Maintenance Policy in Industrial Contexts

Mariagrazia Di Dio, Raffaele Iannone, Salvatore Miranda, Stefano Riemma
University of Salerno, Italy

Aim of the present paper is to propose a framework for the choice of the opportunistic maintenance models for applications in real contexts.

The paper explores firstly the scientific literature on opportunistic maintenance in order to obtain a multi-criteria classification of the main existing models. This allowed us to devise a methodological map for the selection and the choice of the opportunistic maintenance models. This map requires an accurate data collection, performed by the user, in order to assess which of the opportunistic maintenance models is able to more effectively address the problems of a specific facility and/or organization. The paper proposes, for the first time in the literature, a tool aimed at guiding experts and professionals in the field of maintenance among the multiple scientific approaches to opportunistic maintenance in relation to the objectives to be achieved, the relevant restrictions and the available information, also taking into account the complexity of implementation of the different models.

Model-Following Controller Design based on a Stabilized Digital Inverse System

Ryo Tanaka, Hiroki Shibasaki, Hiromitsu Ogawa, Takahiro Murakami,

Yoshihisa Ishida

Meiji University, Japan

This paper explains and demonstrates a model-following controller design based on the stabilized digital inverse system. Conventional digital inverse systems are constructed behind a plant to estimate unknown disturbances. Herein, the inverse system is designed in front of the plant. The model-following controller is then constructed on the basis of this structure. However, when the relative degree of the transfer function for the continuous-time plant is greater than the 3rd order, discrete-time systems often become a non-minimum phase. Furthermore, when a short sampling period is chosen, the inverse system cannot be constructed, because unstable zeros appear. To solve these problems, the auxiliary observation inter-sample output is adopted from the model. In addition, a parallel feedforward compensator is added in parallel with the plant. We confirmed the effectiveness of the proposed method by performing simulations for several plants.

Simulation of Departure Terminal in Soekarno-Hatta International Airport

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Congestion problem in the airport declines the passengers' satisfaction. The passengers' satisfaction is an important matter to the sustainability operation of the airport. Airport management has to develop a company program to improve the quality of service to the passengers. To regulate the passengers' processes, it is important to define the performance of existing system. The objective of this research is to measure the performance the existing system of airport departure terminal and provide a suggestion to airport management of Soekarno-Hatta International Airport. Discrete-event simulation method was developed to measure the system. ProModel simulator software, from ProModel Corporation, was utilized to simulate the existing system of Departure Terminal in the Airport. To measure the performance, authors focus on some indicators i.e. passengers

processing time, passengers waiting time, and utilization of each station.

Enhanced Viability in Organizations: An Approach to Expanding the Requirements of the Viable System Model

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²University of California, United States

The Viable System Model (VSM) is a functional model of organizational structures whose implementation results in a viable system. Despite sound scientific arguments and many successful implementations into organizations, the VSM is still an exotic methodology in the real business environment. One of the possible reasons is that the VSM as defined by Stafford Beer addresses only the structural domain of the control (management) system in an organization and misses some prerequisites for viability. In order to have a more comprehensive approach for implementation of the VSM in organizations that would comprise not only the structural aspect of the control system, this paper proposes six enhanced requirements (prerequisites for viability) that organizations need to strive to fulfill in addition to the structural functional requirements. These enhanced requirements are deduced by analogies to "natural" viable systems, especially the human body.

Deadlock Avoidance Policy for Dual-armed Multi-cluster Tools with Multi-flow

Yushin Watanabe, Tatsushi Nishi

Osaka University, Japan

Cluster tools are widely used for semiconductor manufacturing. Scheduling of multi-cluster tools has been received much attention. A cluster tool consists of several processing modules, transfer module with single or dual-armed handling robot and loadlock modules. The multi-cluster tool consists of two or three cluster tools which are connected with buffer module. In this paper, we present a deadlock-free scheduling for dual-armed multi-cluster tools with multi-flow. We develop a deadlock avoidance policy for dual-armed multi-cluster tools with dual path. A Petri net model is analyzed to derive a deadlock avoidance policy. The deadlock-freeness is confirmed by analyzing siphon of Petri net model. The deadlock-free scheduling method is proposed. The proposed method is applied to the scheduling problem of three-cluster tools with dual path. The computational results show that no deadlock occurs with the proposed deadlock avoidance policy.

An Additive Manufacturing Resource Process Model for Product Family Design

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Additive Manufacturing (AM) has a profound impact on the mass customization of consumer products. To take advantage of this new manufacturing resource we need to incorporate AM into existing design methodologies. In this paper, we address this need by proposing an AM resource process model for product family design. The proposed model captures the ability of AM to produce arbitrary complex structures with virtually no tooling effort and it makes these powerful properties available to practitioners working in the field of product family design. The proposed resource model is based on topology optimization and Finite Element Analysis (FEA). This model produces performance surfaces that can be used to select optimal components for product family design. These optimal components satisfy the product family requirements and address the need for profitability and sustainability.

Simulation of Supplier - Manufacturer Relationship Model for Securing Availability of Teak Log in Furniture Industry with Sustainability Consideration

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²Gajah Mada University, Indonesia

Sustainability consideration is very important in decision making related to furniture industry due to its raw material derived from forest. Forest has important role for people because it gives benefit in economic, social, and environmental aspects. This paper focuses on developing a simulation model for the furniture industry, especially in suppliermanufacturer relationship model for securing availability of teak log with sustainability consideration. The simulation model is used to overcome the uncertainty and the dynamism of real systems and to generate alternative solutions for helping teak log supplier. A supplier has to evaluate and analyze some alternative decisions related to harvest and/or conserve the teak forest. The decision making become complex, because it's related to dynamic forest

age classes, dynamic demand, the growth of tree that has natural characteristics, and the uncertainty of illegal logging. The result shows that simulation can help decision maker to increase supplier's profit by considering sustainability.

Risk Sources and Their Influences on Consumers' Purchase Intention: A Research on Online Catering Group Buying

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²Chinese Academy of Sciences, China

Group buying online has become more and more popular in years. This article is expected to provide valuable references for sales activities in food and beverage service through the research and investigation on risk sources and the factors that affect the purchase intention. The questionnaire survey method is adopted in this paper of the research and investigation on risks sources and the factors that affect the purchase intention. The conclusion is: At the aspect of products characters, consumers' attentions focus on products quality, brand familiarity and evaluation comments by other buyers. At the aspect of characters of the Group buying web sites, transaction safety, website's reputation are the focus from buyers. Finally, the factors such as internet usage experience, price discount, brand familiarity and period of validity, have a prediction function on purchase intention. In addition, the Group buying experiences also has a prediction function on purchase intention.

Trade-In Concept for the Environment

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²De La Salle University, Philippines

This paper is about a framework that would minimize switching costs of an Electric Utility Company's customers and public transportation operators from their existing equipment to a more efficient alternative to be provided by a trade-in company at a minimal or no cost. The concept will also address the concern for the environment by reducing toxic substances into the air caused by vehicle emissions such as carbon dioxide. This concept will also reduce the dependence on fossil fuels especially for the developing countries.

Innovation in Family-owned Food Companies in Japan

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²Ritsumeikan University, Japan

Purpose: This study presents an analysis of the role of innovation among family businesses in the food industry in Japan. We focus on the role of innovation in food containers and packaging. Methodology: We present case studies of four Japanese companies that have achieved successful innovations in food products and packaging. These case studies illustrate the contributors of successful innovation in family businesses. Findings: Our results show that family businesses provide more opportunities for innovation. Originality: This study underscores the strength of the family business in Japan, particularly in the area of innovation and leadership.

A Study of Tourism Promotion Factors Affecting Tourists' Demand in Thailand

Namtip Sakulngam, Sukree Sinthupinyo, Natcha Thawesaengskulthai, Supol Durongwatana

Chulalongkorn University, Thailand

There are variety of tourism products and services, However tourism information is lack of consistency, not updated, and may not suitable to each traveler. As a result, the provided information. Moreover, each travel plan creates many complications such as travel route, travel planning, time and resting place. All of these factors cause the complication of traveling, even for the traveler who has experiences. Hence, this study aims at identifying factors that can increase traveler demand to motivate tourism in Thailand. The study methodology consists of three phases; i.e. reviewing literature to find motivation factors, surveying using questionnaire as a research instrument to collect data from 554 travelers, and indepth interviewing from ten entrepreneurs from all types of travel in Thailand. The study shows that the factors consisting of activity types, reward types, and the traveler types are the motivation affecting travel in Thailand. The activity type is home stay. The reward type is traveling package promotion including the hotel discount and reward goods. These findings can support business to respond traveler's demand effectively.

The "Soft" Obstacles to Quality Excellence Practices: Evidence from the United Arab Emirates Industries

Mehran Doulatbadi, Sha'ri Mohd Yusof, Farhad Nejadi

Universiti Teknologi Malaysia, Malaysia

Achieving an excellence level of quality through a national quality award model is a challenging task, maintaining it is even much harder. This paper attempts to investigate the prevalent and main obstacles related to the quality excellence practices with particular focus on United Arab Emirates industries. Data for this research study were collected using structured questionnaires that were distributed to 132 Dubai Quality Award (DQA) recipient companies. Descriptive statistics was used to assess and rank the level of prevalent obstacles collected from the sample companies. The results indicate the lack of time, high expectations for quick results and lack of sufficient resources, as three potential and common obstacles of quality excellence practices within the UAE industries. The outcomes presented in this paper help organizations in the region to enhance understanding of significant problems that they are facing in their ongoing quest towards higher quality levels.

Session	TK 4 Technology & Knowledge Management (4)
Date	12/12/2013
Time	13:30 - 15:00
Room	Salon A
Chairs	Ville Ojanen, Foo Say Wei

Perfect Interaction: Facilitating Evaluation of Collaborative Technologies for User Engagement in Engineering Innovation Networks

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The swift economic change in contemporary experience has seen successful organisations seek to connect more rapidly and more effectively with others in the creation of new knowledge. The last decade has seen a growing interest in online networks as a formal and informal schema for transferring and generating knowledge within product development. These networks are rooted in the nature of knowledge creation as a socially embedded process. Collaborative technologies have been widely accepted and adopted as platforms facilitating innovation in the interactions of contemporary networks, and this paper seeks to develop an evaluation schema and employ it to examine how such interaction is facilitated through the medium of Web 2.0 technologies in an engineering network. The contribution of this research to theory and innovation technology practice will be to further the understanding of the impact of Web 2.0 technologies on engineering innovation networks.

Universities Coping in the Changing Environment: Case LUT CST

Matti Karvonen, Vesa Karvonen, Jyri Vilko, Tuomo Kässi

Lappeenranta University of Technology, Finland

The changing role of universities is a global phenomenon. Since the 1980s, Finland has been transforming its national technology policy into policy for innovation. At the same time universities are increasingly expected to take part on commercialization in addition to their teaching and research missions. One of the responses to this environmental change has been an attempt to transform universities more into 'entrepreneurial' institutions. University is not an entrepreneurial organization, but the third task of the university has immediate societal impact bringing entrepreneurial features to university. Entrepreneurship can be understood also an atmosphere and a way of working. This paper uses a case of one particular public research organization, Centre for Separation Technology (CST) at Lappeenranta University of Technology (LUT) in Finland, and its activities and processes to manage the change. The challenge seems to be how balance and coordinate the entrepreneurial activities with the traditional university activities.

Drilling Waste Handling and Management in the High North

Yonas Zewdu Ayele, Abbas Barabadi, Javad Barabadi

University of Tromsø, Norway

The Arctic region has a harsh and sensitive environment at a remote location where special local considerations will influence the design, operation and management of any waste handling system installed in the region. In order to develop a suitable waste handling system in the High North, the main technological and operational challenges need to be identified and tackled. In this paper a methodology for identification of waste handling system is developed for offshore drilling activities in the High North. The developed methodology can help to ensure fulfillment of health, safety, environmental, and quality (HSEQ) requirements in the High North. This paper also discusses different options for the handling and management of the drilling waste in the High North.

Forecasting the Success of Knowledge Management Adoption in Supply Chain

Sachin Patil, R. Kant

Sardar Vallabhbhai National Institute of Technology, India

The Knowledge Management (KM) adoption in the Supply Chain (SC) is prolonged as well as expensive and its impact needs longer time. Hence, forecasting of the success of KM adoption in SC is required before going to its actual adoption. This study presents a combined method of fuzzy DEMATEL and FMCDM to forecast the success of KM adoption in SC. The fuzzy DEMATEL method is used to evaluate weighting of each evaluation criteria's, after that FMCDM method uses to obtaining possible rating of success of KM adoption in SC. The proposed method demonstrated with the empirical case study of an Indian organization. The proposed method is useful for forecast the success of KM adoption in SC without actual implementation.

Configuration of High Performance Apartment Buildings Renovation: A Constraint Based Approach

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³TBC Générateur d'Innovation, France

This paper looks at the possibility of configuring high performance renovation of apartment buildings by the use of a constraint satisfaction problem (CSP). A new thermal envelope wraps the whole building and allows it to achieve a really low energy performance of 25 kWh/m²/year. This new thermal envelope is composed of rectangular panels, always comprising insulation and cladding, and sometimes including, in addition, doors, windows or solar modules. The panels can be fixed directly onto the walls or onto a metal structure around the whole building. The decision support system, based on CSP approaches, will simultaneously enable the interactive definition of the renovation, the associated bill of material (BOM) and the building site assembly process. The range of knowledge to exploit and to model leads us to integrate into a single decision support system different constraint types, such as classical, dynamic, geometric and global constraints, as well as their filtering methods.

Product Data Management and Sheet Metal Features – Sheet Metal Part Recognition for an Easier Designing Process Producing Manufacture-friendly Products

Merja Huhtala, Mika Lohtander, Juha Varis

Lappeenranta University of Technology, Finland

PDM systems were created in the mid-1980s. The main goal was to organize the drawings and data sheets, which were created during the designing process. Integration of PDM and CAD led to a situation where an increasing number of features were required from the systems to help the designers. Finally, this situation developed to a point where no one was actually sure what contribution the PDM was making. Nowadays, sheet metals are universally used in different kind of industries. Designing is challenging in many ways, therefore, if the PDM could recognize sheet metal parts it could help the designing process. With the help of the PDM and the DFMA, the products should be more manufacture friendly and the designing time possibly shorter. This paper points out the complexity of designing sheet metals, and raises the question of whether the PDM system could be a helpful tool for designing manufacture friendly products.

Session	TK 5 Technology & Knowledge Management (5)
Date	12/12/2013
Time	15:30 - 17:30
Room	Salon A
Chairs	Dotun Adebajo, Pei-Lee Teh

Commercialization of Early Stage University-based Inventions

Matti Karvonen¹, Rahul Kapoor¹, Ville Ojanen¹, Jussi Heinimö¹, Hannu Tervonen²

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The changing university environment have meant a substantial rise in the rate of commercialization of university-based technologies. This paper presents a theoretical analysis of technology transfer process as perceived by different stakeholders in the innovation lifecycle. Data is collected using semi-structured interviews with inventors, technology transfer personnel, patent attorneys, consultants and investors. Secondly, the secondary patent and market data was utilized for the selected case. This paper uses a case of Lappeenranta University of Technology (LUT) and its ongoing activities to accelerate the commercialization process. The study takes one potential university-based inventions – Micro Organic Rankine Cycle energy converter – for deeper examination. The results contribute to a better understanding of successful technology transfer process and the potential challenges in the commercialization of early stage technologies.

Research on Radical Innovation Design Process on the Stage of Fuzzy Front End by TRIZ

Enshun Ping, Runhua Tan, Jianguang Sun, Lizhen Jia

Hebei University of Technology, China

As a high-efficiency technology innovation, radical innovation (RI) can be applied for modern enterprises to achieve leaping-over development. It's the great significance for enterprises to upgrade technology and enhance the capability of the independent innovation. Based on TRIZ ideal final result (IFR) and technology evolution theory, the technology forecasting process of product technology system radical innovation is put forward. The paper offers a kind of innovation method for product radical innovation design on the stage of fuzzy front end (FFE), which considers the result as the final high quality ideas of FFE. As a case study, the direct shift gearbox (DSG) is investigated. The study shows that the adoption of this method makes the application of the initial stage of product development feasible.

Patent Portfolio Analysis Using Citation Categories

Rahul Kapoor, Samira Ranaei, Matti Karvonen, Tuomo Kässi

Lappeenranta University of Technology, Finland

This paper presents a method of using citation categories as a patent value determinant. The method is used to analyze the patent portfolios of players in the European wind power market. Patent data for the case firms is obtained from European Patent Office's (EPO) worldwide PATSTAT database. Measure of hindrance and measure of encroachment are defined as a way of assessing competitor patent portfolios. The results can help technology managers assess the competitiveness of their patent portfolios. It can help investors predict technology leadership in an uncertain environment of emerging industries.

Agility of Capability Development: The Multiple-Case Study of Ericsson, Google, Microsoft and Nokia

Alar Kolk¹, Mait Rungi²

¹Aalto University, Finland

²Tallinn University of Technology, Estonia

Dynamic capabilities are meant to cope with environmental changes, and since the changes happen more often and speed to market is increasing, then the ability to identify corresponding capabilities quickly is becoming extremely important. This study investigates the agility aspect of capability development in a qualitative setting on the basis of four large information and communication technology companies. Findings support that the existence of a supportive environment in the form of a large capability portfolio and large alliance portfolio are pre-requirements to speed up capability development in contemporary market circumstances.

Enhancing NPD Operational Performance Through B2B and B2C Customer Involvement for Varying Degrees of Product Technology

Dinush Wimalachandra, Bjoern Frank, Takao Enkawa

Tokyo Institute of Technology, Japan

The present article addresses how different types of B2B customer involvement motives and B2C customer involvement motives affect different dimensions of new product development (NPD) operational performance in the B2B context. This study also explores the moderating effects of high vs. low product technology on the relationships between different types of customer involvement motives and different dimensions of NPD operational performance. Based on data collected from the textile and apparel industry in 10 countries, the current study illustrates that B2C customer involvement has a greater impact than B2B customer involvement on time-to-market. Nevertheless, B2B customer involvement plays an important role as it contributes more to quality than does B2C customer involvement. In addition, the study explains the different strategies that should be adopted in B2B and B2C customer involvement when high vs. low product technology is present.

Knowledge Capitalization and Synthesis for Integrated Circuit Manufacturing in Thailand

Suthep Butdee, Varavut Hirunyasiri

King Mongkut's University of Technology North Bangkok, Thailand

This paper proposes the knowledge capitalization and synthesis for an integrated circuit manufacturing company which produces microchip. The Microchip technology is rapidly developed and highly quality needed. Therefore, it requires novel and modern knowledge to improve quality and productivity. Traditionally, knowledge is maintained by using documents according to an ISO procedure. The research contributes suitable ways of using media to communicate among staff effectively and transfer knowledge to organization. New transformation knowledge is applied and synthesis before stored in the knowledge based library. The questionnaire is created and distributed through the quality department. It is then analysed. The result of investigation is that the suitable knowledge synthesis media includes email, announcement board and group meeting.

Session	OR 3 Operations Research (3)
Date	12/12/2013
Time	13:30 - 15:00
Room	Salon B
Chairs	Ali Siadat, Shin-Guang Chen

A Note on Dynamic Programming Formulations for Scheduling Job Classes with Changeover Times on a Single Machine

Eiji Mizutani

National Taiwan University of Science and Technology, Taiwan

We consider the problem for scheduling N jobs that are partitioned to F disjoint classes (or families) subject to changeover (or setup) times in order to minimize the total weighted completion time. We first identify a published inefficient forward dynamic programming (DP) procedure due to Potts (1991) that works in $O(F^2N^{F+d})$, where d is the number of different changeover values ($d < F^2$). We then show how to make a forward DP progress in $O(F^2N^F)$ by modifying the evaluation of stage costs. Although the posed scheduling problem is believed to be amenable to backward DP (rather than forward DP) in the literature, the resulting forward DP can work at least as efficiently as an existing (best-known) backward DP procedure. In other words, both forward and backward DPs can be rendered equally efficient when the definitions of states are changed appropriately for DP procedures. This is why DP formulations are often said to be quite an art.

Modeling Multi-stage Assembly Systems with Finite Capacity as a Queueing Network

Saeed Yaghoubi¹, Amir Azaron²

¹*Iran University of Science and Technology, Iran*

²*Istanbul Sehir University, Turkey*

This article models a multi-stage assembly system with finite capacity as an open queueing network using continuous-time Markov process. We also propose a multi objective model with three conflicting objectives to optimally control the service rates, and apply the goal attainment method to solve a discrete-time approximation of the original multi objective problem.

Batching and Sequencing of Incompatible Job Families for a Single Machine Problem

Mohamed K. Omar¹, Yasothei Suppiah²

¹*Nottingham University Business School, Malaysia*

²*Multimedia University, Malaysia*

This paper extends the work of Omar and Suppiah [1] and proposes three combinations of heuristics that aim to minimize the total weighted tardiness for batching and sequencing of jobs originated from incompatible families with sequence dependent family setup time to be processed on a single machine. The developed three-combination include EDD-EDD, EDD-BATCS and ATC-BATCS. Computational performance experiments of EDD-EDD, EDD-BATCS and ATC-BATCS using 640 randomly generated instances was studied. The results indicate that the ATC-BATCS has outperformed the other two heuristics in terms of quality of the solution (minimizing total weighted tardiness).

Complexity Analysis of the Discrete Sequential Search Problem with Group Activities

Kris Coolen, Roel Leus, Fabrice Talla Nobibon

KU Leuven, Belgium

This paper studies the computational complexity of the discrete sequential search problem with group activities, in which a set of boxes is given and a single object is hidden in one of these boxes. Each box is characterized by a probability that it contains that object and the cost of searching that box. Furthermore, each box may be related to one or more 'group activities'. For 'conjunctive' group activities, a box can be searched only when all the associated group activities have been performed whereas for 'disjunctive' group activities, a box can be searched as soon as at least one of the associated group activities has been executed. A cost is also incurred when performing a group activity. The goal is to find a sequence in which the boxes are to be searched and the group activities will be executed to minimize the expected total cost while satisfying the precedence constraints imposed by the group activities. In this paper, we prove that this problem is strongly NP-hard both for conjunctive group activities and for disjunctive group activities, and we discuss some special cases that can be solved in polynomial time.

The Development of Heuristic for Solving Multi Objective Mark Planning Problem in Garment Industry

Kritsada Puasakul, Paveena Chaovaitwongse

Chulalongkorn University, Thailand

Mark planning is an important process of garment manufacturing. The main function is to generate a set of markers that will be used as cutting patterns in cutting process. In this paper, multi objective mark planning is formulated as integer nonlinear programming (INLP) which nonlinear terms occurred in both objective and constraints. Moreover, objective functions consist of set up cost, excess part cost and total standard deviation. Constraint programming approach established in ILOG-CP is used to investigate the complexity and difficulty of this proposed problem. However, this method takes too long computational time before obtaining the optimal solution. Hence, the heuristic approach designed based on the hierarchical improvement and decomposition concept together with special properties of this problem is developed. In this method, each objective component will be sequentially manipulated and improved with respect to their relative priorities. To verify this developed heuristic, many test instances which partially relate to industrial information are generated and tested. The developed heuristic is shown to give the comparable solutions in reasonable computational time compare with ideal point which is derived from solving three single objective models in many test instances.

Optimization Model for Part Nesting for Packing Problem

Mojahid Saeed Osman

King Fahd University of Petroleum and Minerals, Saudi Arabia

The problem of packing cylindrical parts into rectangular is complex and involves issues relating to geometry, and heterogeneity in the parts and in their nesting requirements. Presently, putting parts within the internal diameter of another part is accomplished ingenuity by operators who are unable to decide on the best nesting that maximizes the number of parts being nested. This paper addresses the nesting of parts within one another as subproblem. We describe the development of integer LP model that resembles the transportation problem for nesting of cylindrical parts into rectangular. The model considers rules that need to be followed in part nesting.

Session	OR 4 Operations Research (4)
Date	12/12/2013
Time	15:30 - 17:30
Room	Salon B
Chairs	Amnon Gonen, Emrah Demir

A Stochastic Programming Formulation to Minimize the Total Traveling Cost on the Northern Sea Route

Jinho Lee, Seongho Baek
Korea Naval Academy, South Korea

We consider the problem minimizing the total traveling cost on a network under uncertainty in using edges due to some obstacles unable to pass the edges. We formulate this model as a two-stage stochastic program. Such a model can be applied to achieve the least-cost path crossing over the Northern Sea Route on the Arctic by considering ice floes as obstacles that incur some extra cost to break it or detour from the path. Lagrangian relaxation is employed to solve an instance of large-scale by relaxing the coupling constraints linking the two different types of decision variables with the associated Lagrangian multipliers. It turns out that the relaxed problem can be separate into the two well-known problems, the shortest path problem and the 0-1 knapsack problem. In addition to establishing a lower bound from the Lagrangian relaxation, an upper bound can be obtained by finding a feasible solution via variable fixing.

Restoration of Randomized Model Characteristics under Small Amounts of Data: Entropy-Robust Estimation

Yuri Popkov, Alexey Popkov
Institute for Systems Analysis, Russian Academy of Sciences, Russian Federation

The paper presents a new approach to defining the relationships between small amounts of input and output data. This approach proceeds from involving randomized (static and dynamic) models and estimating the probabilistic characteristics of their random parameters. We consider static and dynamic models described by Volterra polynomials. The procedures of robust parametric and non-parametric estimation are constructed by exploiting the entropy concept based on the generalized informational Fermi-Dirac entropy and the generalized informational Boltzmann entropy.

A Model of Placing Liaisons in Multi-levels of an Organization Structure of a Complete Binary Tree Minimizing Total Distance

Kiyoshi Sawada
University of Marketing and Distribution Sciences, Japan

This paper proposes a model of placing liaisons in multi-levels of a pyramid organization structure such that the communication of information between every member in the organization becomes the most efficient. When L nodes of liaisons which get adjacent to all nodes at each depth of L depths are placed in a complete binary tree of height H , an optimal set of depths $\{N_1, N_2, \dots, N_L\}$ ($H \geq N_1 > N_2 > \dots > N_L \geq 2$) is obtained by minimizing the total distance which is the sum of lengths of shortest paths between every pair of all nodes in the complete binary tree. It is shown that $\{N_1, N_2, \dots, N_L\}^* = \{H, H-1, \dots, H-L+1\}$.

Sequential Testing of 3-level Deep Series-parallel Systems

Gurkan Işik, Tonguc Ünlüyurt
Sabanci University, Turkey

Sequential testing problem requires the determination of the correct state of a system with the minimum expected cost. It has a wide range of applications. We consider the Sequential Testing problem of 3-level deep Series-Parallel systems. We show that it is possible to compute the expected cost of permutation strategies efficiently. We develop a hybrid simulated annealing-tabu search algorithm by utilizing this efficient method and we report the results of computational experiments for this algorithm and other algorithms proposed in the literature and their extensions.

Influence of Cutting Parameters in Face Milling of Nodular Cast Iron Grade 500 Using Carbide Tool Affect the Surface Roughness and Tool Wear

Surasit Rawangwong, Worapong Boonchouyuan, R. Burapa, J. Chatthong
Rajamangala University of Technology Srivijaya, Thailand

The purpose of this research was to investigate the effect of main factors on the surface roughness in nodular cast iron FCD 500 face milling by carbide tool. The results obtained from the analysis which used in the automotive industry, manufacture of molds and other parts of the industries. The etching experiments using semi-automated milling machine Obraeci Strojie brand FGV 32 model. Concerned the material was nodular cast iron FCD 500 using inserts carbide tool. The factors study used a speed, feed rate and depth of cut. Preliminary experiments showed that the depth of cut does not affect the surface roughness fix depth of cut at 2 mm. The experiment illustrated that the factor affecting surface roughness was feed rate and cutting speed with tendency for reduction of roughness value at lower feed rate and greater cutting speed, it was possible determine a facing condition by means of the equation $Ra = 0.996 - 0.000597 \text{ speed} + 0.000485 \text{ feed rate}$. Leading this equation goes to use is in limitation speed 710-1,400 rpm at feed rate 224-450 mm/min. From the experiment is to confirm the result of a comparison between the equation and the action value. The result from the experiment of mean absolute percentage error of the equation of surface roughness is 3.90% which is less than the margin of error and is acceptable. Pattern of wear was similar to mechanical fatigue cracking. It may be due to the very tip of the cutting tool or an impact and flank wear as cutting tool materials resistant to wear less.

The Role of Purchasing Management Towards Sustainable Supply Chain: A Lifecycle Perspective

Kamonmarn Jaenglom, Zaheer Tariq
University of Bergamo, Italy

The concept of sustainable growth has been gaining ground to more intense competition in the business world. To contribute a more sustainable business, organizations should reconceive their value creation by inwardly focusing on economic, environmental and societal values simultaneously. As purchasing and supply management has been on the forefront of every business process, the decision making in this process should understand the various potential risks over a long time horizon in term of a product lifecycle perspective. In this view, the paper aims to develop strategic purchasing and supply management based on the Kraljic Model for building a long-term systematic thinking towards supply chain sustainability. The support of the model coupled with a lifecycle perspective would allow the organizations to design suitable long term purchasing strategies, contributing more sustainable values along an entire supply chain.

Session	HF 2 Human Factors (2)
Date	12/12/2013
Time	09:00 - 10:30
Room	Rachavadee
Chairs	Shih-Miao Huang, Suprakash Gupta

A Study of Affective Meanings Predicting Aesthetic Preferences of Interactive Skins

Shih-Miao Huang
National Formosa University, Taiwan

This study was to explore the affective qualities which influence subjects' aesthetic preferences. Forty-six subjects assessed sixteen skins on an aesthetic preference scale and eleven affective meaning scales. The aesthetic preference was regarded as a dependent variable; the eleven affective meanings were independent variables. The Stepwise Regression Analysis was performed. The result showed that six affective meanings: "exquisite", "original", "strong", "childlike", "intense" and "pure" entered the model. Besides, "exquisite", was the most important affective quality in judgment of aesthetic preferences. It implied that designers had to create the interactive interfaces with an "exquisite" affective quality to please users' aesthetic affects. Furthermore, the other five affective meanings which were not selected into the model were called LoSPA affective meanings. It indicated that subjects had different aesthetic preference levels for skins evoking the affective meaning in LoSPA. It implied that a specific user group would prefer the skins evoking the affective meaning.

The Discussion of Machinery Manufacturing Industry Employees' Self-Efficacy, Organizational Learning and job Performance: The Example of Taichung Industrial Park

Tzue-Hwa Jiang, Shien-Liang Chen
Asia University, Taiwan

The purpose of this study is to explore the mediating effect of self-efficacy in the organizational learning and job performance relationships using the machinery manufacturing employees in Taichung Industrial Park (T.I.P) as the research targets. Through reviewing of the literature in self-efficacy, organizational learning and job performance, I establish a causal relationship among three constructs. The research questionnaires were sent to 320 employees among 80 of 209 mechanical equipment manufacturing firms using of stratified random sampling study, there returning of 257 questionnaires were designed as a research tool basis using of the hierarchical regression analysis to confirm that self-efficacy through the mediating effect of organizational learning, and be able to affect on organizational performance, and to discuss the managerial implications based on the results to propose the directions for future research.

Comparison of AHP and Fuzzy AHP Methods for Human Resources in Science Technology (HRST) Performance Index Selection

Ying-Chyi Chou¹, Hsin-Yi Yen¹, Chia-Chi Sun², Jau-Shin Hon¹
¹Tunghai University, Taiwan
²Tamkang University, Taiwan

The purpose of this article is to compare AHP and fuzzy AHP methods for human resources in science technology (HRST) performance index selection. Both the AHP and Fuzzy AHP are extremely useful when a decisionmaking process is complex, as they can prioritize multiplechoice criteria into a hierarchy by assessing the relative importance of criteria, and generate an overall rank of alternatives.

Generating a Research Keyword Structure on Human Haptic Interaction using a Social Network Analysis Tool

Joobong Song¹, Ji Hyoun Lim², Sanghyun Kwon¹, Ilsun Rhiu¹, Byungki Jin¹, Sangoo Bahn², Myung Hwan Yun¹
¹Seoul National University, South Korea
²Hongik University, South Korea
³Myongji University, South Korea

The field of haptic interaction is inherently multidisciplinary and adopts knowledge from many areas, including robotics, experimental psychology, biology, computer science, systems and control, and others. It is an important first step in research reviewing overall areas of haptic related researches, as well as reviewing the specific area of focus. For this purpose, it is important to ensure objective research direction based on the clear and enlightening analysis of the research trends in this field. This study aims to identify the relationship among overall areas of haptic related researches using a network analysis technique. We collected keywords of haptic related researches from several journals and used those as an input for conducting network analysis. Then, we also classified the areas of haptic researches by analyzing the relationship among keywords. From the network analysis, we found that haptic related researches could be classified into two areas; (1) Technology perspectives related to the application of haptic technology and (2) User perspectives related to the perception of haptic sensation. The keyword structure generated from this study is expected to provide basic knowledge on the trend and current status of researches in human haptic interaction.

Emotional Mental Model

Constantin von Saucken, Ioanna Michailidou, Udo Lindemann
Technische Universität München, Germany

The design of User Experience (UX) demands the consideration of expectations and remembrance on the product use. We think of mental models (widely used in usability) as being a good approach to influence expectations, although emotional aspects are not considered so far. In this paper we introduce the concept of Emotional Mental Models and corresponding product descriptions to help researchers, designers, customers and other stakeholders in UX design process anticipating experiences and communicating the emotional impact. These representations need to be rather image-based focusing the emotional description coming from users' motives instead of a technology-driven perspective. We discuss storytelling and metaphors as suitable representations to create shared Emotional Mental Models. Furthermore, we describe the deficit of representations in design practice and the potential to enrich engineering design by appropriate illustrations.

Preliminary Study on Systematic Literature Review of Vision Research

Y. L. Rhee¹, Ji Hyoun Lim², S. H. Ahn¹, G. W. Kim¹, Myung Hwan Yun¹
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²Hongik University, South Korea

This study introduces systematic review of literatures on human vision. Both content analysis and network analysis are used to quantitatively analyze recent trends in human vision research. Three terms, 'visual search', 'eye movement' and 'eye track', were selected as the central keywords characterizing the research field. Seven sub-categories of research keywords were selected and analyzed in content analysis method. Chronological application on content analysis showed a distinct trend that the publications of 'experimental studies' on human vision have continuously increased comparing to the 'theoretical studies'. Network analysis showed unique structural characteristics on three search keywords, showing the keyword 'eye movements' play a critical role in connecting various areas of vision research. Using the results of the study, it was possible to point out; (1) the structural characteristics of a potential research topic and (2) the relationship between the research topic and keyword networks generated from this study.

Session	ET Engineering Education & Training
Date	12/12/2013
Time	11:00 - 12:30
Room	Rachavadee
Chairs	Arik Sadeh, Jan Harm Pretorius

Triple Constraint Considerations in the Management of Construction Projects

Tshweu Mokoena, Jan Harm Pretorius, Jurie Van Wyngaard
University of Johannesburg, South Africa

Projects over the years failed to be completed within the specified triple constraint, hence lack of development in skills and infrastructure. The objective of the research is to assess the triple constraint and determine sources of failures in order to increase the success rate of construction projects in South Africa and to give priority on the triple constraint. Both the contextual and fieldwork survey attribute failure of construction projects to lack of understanding and poor management of the triple constraint elements and trade-offs.

From the Development of Robots to the Management of Organizations – a Discussion of the Integrative Approach of the Industrial Engineering Discipline

Sigal Korol-Kordova, Moti Frank, Arik Sadeh
Holon Institute of Technology, Israel

This paper deals with academic undergraduate 'Industrial Engineering and Management' programs.

The recent evolving changes in the economy and industry must be updated and adapted to the industrial engineering curriculum, whose graduates will be integrated into the competitive market.

During this study, a T-Shape dilemma had been examined in regard to curriculum in the discipline of industrial engineering and management. The T shape dilemma discussed here places the depth of the curriculum in industrial engineering as oppose to the extent of the curriculum as a widthwise multidisciplinary.

In order to examine this dilemma, 16 semi-structured interviews were held with senior-level managers in industry, as well as with leading academicians in the industrial engineering discipline. The findings were divided into 77 main repeating categories that rose during the various interviews. From a content analysis of the interview findings, several principles may be deduced upon which the industrial engineering curriculum in academia should be based.

Knowledge Transfer Practices at Indian Premier Institute of Higher Learning in Technology

Kalyan Kumar Bhattacharjee, Ravi Shankar, M. P. Gupta
Indian Institute of Technology Delhi, India

In this paper the status of knowledge transfer at an premier Indian Institute of Higher Learning in Technology (IHLT) have been portrayed. Smooth knowledge transfer helps in better understanding of the subject and it helps in achieving administrative and academic efficiency. An questionnaire-based survey has been done where responses of 922 UG students have been analyzed to ascertain the extent to which knowledge transfer is successful in IHLT.

The Impact of Teacher and Peer Communication on Adolescents' Learning Outcomes – Positive Perception Makes Better Performance

Jianhong Li¹, Gangyu Jin¹, Yi Wen Chen²
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²*Chinese Academy of Sciences, China*

This study aims to probe the effects of teachers' and peers' communication style and quality on adolescents' cognitive and emotional learning by questionnaires and regression analysis. The relations between impact of emotional learning and academic learning are examined; and the intermediate variable of learning performance is found out to be learning motivation. Results show that students' perception of communication style would will affect their learning. Emotional learning affects cognitive learning-positive perception makes better performance, and vice versa. Among communication styles, the attentive style has an impact on communication quality. Communication quality does have influence on academic performance, but it is mediated by teacher-student communication relationship perceived by students. Motivation partially mediates the influence of teacher-student and peer communication on students' learning outcomes.

Exploring the Required Personality Traits for Automotive Technician: A Human Resource Development Perspective

Hsiu-Te Sung, Han-Jau Niu
National Taiwan Normal University, Taiwan

The purpose of this study aimed to establish indexes of "Required Personality Traits of a Technician for Automotive Mechanic". Seven personality domains were developed that included influence, self-drive, self-awareness, socialization, thoroughness, self-management ability, and psychological adjustment, meanwhile, each domain contained six indices as an initial step. Those indices were reviewed via a developed Delphi questionnaire with two surveys. Experts were composed of nine scholars and administrators respectively. The final indices consisted of forty-six items from Execution Ability, Loyalty, Self- Management, Self-Drive, Communication and Coordination, Psychological Adjustment, Influence, and Tolerance.

Evaluation of a Restful Web Services Driven Three Dimensional E-learning Platform with Mashup for Ubiquitous and Personalized Learning

Chuan-Jun Su, P. T. Liu, Cheng Huang
Yuan Ze University, Taiwan

The ultimate goal of E-learning – "empowerment" which enables learners to complete their dynamic learning processes in a personalized, social, and ubiquitous setting has not been fully realized. With the introduction of Web 2.0 technologies, E-learning 2.0 takes a "lightweight, loosely coupled" approach that integrates discrete but complementary widgets and web services. However, E-learning 2.0 is still suffering from untrustworthiness as being created by amateurs and way of wasting time in chat or social networking. In this paper, we describe our development of a Restful web services driven three dimensional E-learning platform REMAP with built-in mashup capability to transgress the boundaries of traditional institutions and access tools/services easily for personalized ubiquitous learning. We discuss three dimensions to investigate the satisfaction and usability of using REMAP. The REMAP can not only promote learning that is more richly collaborative but also enable learners to come closer to 'anytime anyplace' learning.

Session	DM 2 Decision Analysis & Methods (2)
Date	12/12/2013
Time	13:30 - 15:00
Room	Rachavadee
Chairs	Usha Ananthakumar, Ralph Riedel

Stochastic Total Cost of Ownership Forecasting for Innovative Urban Transport Systems

Dietmar Goehlich, Felix Spangenberg, Alexander Kunith
Technical University of Berlin, Germany

This paper presents a financial forecasting method for innovative urban transport systems. The Monte Carlo simulation accounts for future uncertainties such as technology-related and market risks. The method is based on a total cost of ownership (TCO) approach and exemplary results are shown for the introduction of an innovative electric bus system in the city of Berlin. The input parameters are stochastically modeled including future adverse events as well as favorable scenarios for the years 2013, 2020 and 2030. In contrast to determined future scenarios which provide only discrete results, the probability distribution of future system TCO is assessed. The simulation reveals when alternative technologies reach the TCO break-even. The results can be used to derive a technology roadmap. Furthermore, using a suitable visualization the decision-making process for complex investments typical for technology changes (e. g. replacement of a complete bus fleet) is supported.

Semiconductor Yield Loss' Causes Identification : A Data Mining Approach

Hasna Barkia, Xavier Boucher, Rodolphe Le Riche, Philippe Beauce, Marie-Agnès Girard, D. Rozier

Ecole Nationale Supérieure des Mines de Saint-Etienne, France

Semiconductor manufacturing processes are known to be long and complex. Starting from a silicon wafer, multiple treatments are applied for about three months. Mastering the manufacturing process and a rapid identification of yield loss' causes are the keys to a successful manufacturing site. A production cycle is composed of a combination of production and quality inspection steps. Data are collected at production and quality control steps which lead to huge heterogeneous databases. In order to understand yield loss causes, we propose a KDD (Knowledge Discovery from Databases) approach, which explores the knowledge hidden in these multiple databases, by identifying, first, clusters in the different databases and, second, relational patterns between them. These relational patterns represent potential yield loss' causes.

P2CLUST: an extension of PROMETHEE II for ordered clustering

Yves De Smet

Université Libre de Bruxelles, Belgium

We address the problem of multicriteria ordered clustering i.e. the detection of ordered categories in a multicriteria context. Therefore, we propose an extension of PROMETHEE II called P2CLUST. The algorithm is both inspired by the kmeans procedure and the underlying idea of the FLOWSORT method. The algorithm is tested on two real examples.

Selection of Non-traditional Machining Processes: A Distance Based Approach

Tonmoy Choudhury¹, Partha Pratim Das¹, Manish Roy¹, Ishwar Shivakoti¹, Amitava Ray², B Pradhan¹

¹*Sikkim Manipal Institute of Technology, India*

²*National Institute of Technology, India*

With accelerating progress in the field of machining, use of newer and harder materials like titanium, stainless steel, high-strength temperatureresistant (HSTR) alloys and ceramics has become common and has resulted in a number of available Non-traditional machining (NTM) processes. With increased number of available options, the need arises to select the most efficient NTM process for machining a desired shape feature on a given material. This paper focuses on selection of NTM process based on hybridized 'technique for order preference by similarity to ideal solution' (TOPSIS) and an analytical hierarchy process (AHP) expert system in which an AHP matrix is referred. The weights of this matrix are obtained from the process selection criteria. Further depending upon the weights obtained, the relative closeness of the NTM alternatives are evaluated using TOPSIS which shows that Electrochemical Machining (ECM) and Plasma arc Machining (PAM) are the best NTM processes and the worst NTM process is Electro Discharge Machining (EDM).

Modeling Brain and Behavior of a Terrorist through Fuzzy logic and Ontology

Rajkumar Vishwakarma, R. Shankar

Indian Institute of Technology Delhi, India

Security agencies across the world are facing major challenge from the terrorism. Challenge lies in establishing intergang relationship and intra-gang behaviour. Though security agencies maintain structured and unstructured data, mining the database and doing predictive analysis is still very difficult task. In India various terrorists groups viz Al-Qaida, LeT and other international militant groups carry out various disruptive activities. In 2010, 132 police officers lost their lives in various operations against militants and extremists in India. We have shown how ontology of crime-criminal world can help in establishing intergang relationship. Call records of phones can be analyzed and ontology can link various criminals belonging to various gangs and can predict inter-gang relationship. Based on the field data we have shown how terrorists based in Northeast India have developed links with Left-wing extremists operating in central part of India. At the end we provide a mathematical model based on fuzzy logic to understand extent of criminality.

Vehicle Scheduling Problem: A Comparative Study between Light Truck and Motorcycle in Small Patisserie Network

Chivalai Temiyasathit, Phathinan Thaitatkul

King Mongkut's Institute of Technology Ladkrabang, Thailand

Transportation and distribution network are mandatory keys for the business expansion and successful; hence, numerous researches in improving transportation efficiency have been introduced. Our study introduces an alternative to improve the transportation efficiency as well as assist in decision making of management team. A case study of a small patisseries chain in which the main transportation characteristic is subjected to temperature sensitivity is introduced. This study can be categorized as vehicle routing and scheduling problem with time window constraints. A comparative study between two types of vehicle is conducted. The vehicle routing and scheduling are simulated in the various criteria. The result shows that motorcycle is more preferable for single supplier with six customers located in the metropolis. Motorcycle overcomes light truck in term of fixed cost, but yield slightly higher variable cost. However, when the number of customer increases, light truck becomes more preferable in term of vehicle capacity.

Session	DM 3 Decision Analysis & Methods (3)
Date	12/12/2013
Time	15:30 - 17:30
Room	Rachavadee
Chairs	Frank Felder, Zhe Zhang

Application of Extreme Value Theory in Commodity Markets

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Extreme value theory (EVT) is the theory of modelling and measuring events which occur with very small probability. This implies its usefulness in risk modelling as risky events happen with low probability. In our study, we have focused on the prices of Gold and Silver which have been one of the preferred investments over the centuries. Initially, univariate analysis is carried out to model the extreme values of gold and silver separately. In order to assess the joint behavior, bivariate analysis is also carried out on the extreme values. Thus, Extreme value theory is used to know the characteristics of the distribution of these precious metals thus enabling us to choose a better model by focusing on the tails of the distribution.

Change Propagation Analysis for Sustainability in Product Design

Sam Yeon Kim¹, Seung Ki Moon¹, Hyung Sool Oh², Taezoon Park³,

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Components in complex systems are intricately interconnected with each other. When design changes are needed in terms of sustainability, it is necessary to understand how change propagates and affects other systems. Therefore, the objective of this paper describes how to define the cause of a sustainable design change and the effect of change propagation by utilizing Change Propagation Analysis (CPA) and system dynamics. The interconnections of components in a complex system are investigated by Design Structure Matrix (DSM) and system dynamics. Design changes are subdivided into sustainable classes by the sustainable checklist. The likelihoods of design change are measured by designers in functional DSM and sustainable impact values are calculated by using the sustainable checklist and expressed in sustainable DSM. The system dynamics is used to analyze and visualize patterns and behaviors of sustainable changes based on DSM.

Equilibrium Strategy of a Processor-Sharing System with Discriminatory Discipline

Ying Shi, Zhaotong Lian

University of Macau, China

We study the equilibrium strategies of a processor-sharing service system with discriminatory discipline. We consider both cases that customer can or cannot observe how many customers in the system upon arrival. Respectively, we obtain a threshold strategy for each class of customers in the observable case, and the customer's equilibrium arrival rate in the unobservable case. And further, we derive the bounds of the service price and give an effective algorithm to calculate the optimal service price to maximize the service provider's profit. Finally, some numerical examples are given to verify our results.

Weighted Additive Fuzzy Goal Programming-based Decision Support System for Green Supply Network Design

Kanda Boonsothonsatit, Sami Kara, Berman Kayis, Suphunnika Ibbotson

The University of New South Wales, Australia

Green supply network design (GSND) requires trading off multiple objectives like cost, lead time, and environmental impact. These objectives may be in conflict with each other as well as being vague when their target values (goals) are specified with different weights corresponding to supply chain strategies. The multiple conflicting objectives are optimized by using Goal Programming (GP). GP integrates with Fuzzy set theory (FGP) to address the goal vagueness and Weighted Additive operator (WAFGP) to allow decision makers differently emphasizing the goals. The WAFGP-based Decision Support System (DSS) for GSND contributes to the Pareto-optimal cost, lead time, and environmental impact in correspondence with supply chain strategies.

Multiple Criteria Model for Evaluation and Selection of Outsourcing Service Countries: A Case Study in the East and Southeast Asia

James K. C. Chen, Van Kien Pham, Chih-Sung Chang, Thi Le Huyen Nguyen

Asia University, Taiwan

Outsourcing has for some time been, considered as one of the most effective strategies by which firms may reduce costs and sustain their competitive advantages over rivals. Making an outsourcing decision is a very complex process because it requires decision-makers (DMs) to make a comprehensive evaluation of multiple criteria which often conflict with each other. The evaluation and selection of these countries is therefore basically a multi-criteria decision making problem (MCDM). Over the last two decades, there is a great number of method have been introduced to deal with MCDM problems, so it would be more perfect to look at MCDM methods as a whole. For these reasons, the purpose of this paper is to review the literature of MCDM methods, and thereby to construct a simple MCDM-based model to help managements evaluate and select the best outsourcing location for their companies. The study utilized the AHP approach as an empirical example to confirm the usefulness of the MCDMbased model based on seven typically emerging countries chosen from the East and Southeast Asia regions. In short, the research provides general view and practice for readers and DMs in relation to the problem of outsourcing destination selection.

Hotel Classification Visualization Using Natural Language Processing of User Reviews

Takayuki Suzuki, Kiminori Gemba, Atsushi Aoyama

Ritsumeikan University, Japan

The number of consumer-generated media etc has increased rapidly because of the diffusion of the Internet. Moreover, word-of-mouth communication has increased as well. However, many enterprises are unable to effectively analyze such information to offer better products and services to their customers. To address this strategic deficiency, some enterprises have analyzed these communication trends as a means to improve the quality of the services they provide, and thus, increase customer satisfaction. Accor Hotels, for example, relies on a consulting firm to analyze word-of-mouth communication with the aim of improving the quality of the company's services. Given these trends, the objective of this study was to use a technique called natural language processing to analyze word-of-mouth communication among consumers regarding their experiences with various hotels. Further, we seek to categorize and visualize language patterns on the basis of the value the hotel enterprises provide for their customers.

Session	SC 3 Supply Chain Management (3)
Date	12/12/2013
Time	09:00 - 10:30
Room	Ubonchard
Chairs	Gyan Prakash, Edie Schmidt

Pricing Strategy of Closed-loop Supply Chain Based on Premium and Penalty Mechanism

Juhong Gao, Wang Haiyan, Han Hongshuai, Hou Liting
Tianjin University, China

This work analyzes the pricing strategy of closed-loop supply chain (CLSC) based on premium and penalty mechanism under decentralized decision-making using Stackelberg game. The four strategies (free strategy, subsidization strategy, carbon taxation strategy, subsidization and carbon taxation strategy) of premium and penalty mechanism are studied. The equilibrium values for CLSC member decisions are derived. Analytical results suggest that government should adopt the subsidization and carbon taxation strategy which can not only effectively reduce total carbon emissions, but also enhance recycling rate. Numerical results validate the conclusion, and further analyze the effects of subsidies and carbon taxes on the recycling rate, total carbon emissions and profits of CLSC.

3-Echelon Distribution Policy with Order Flexibility and Direct Ordering System

Yosi Agustina Hidayat, Lucia Diawati, Yudi Thaddeus, Seto Sumargo
Bandung Institute of Technology (ITB), Indonesia

This paper considers a three-echelon supply chain inventory problem consisting of single manufacturer, distributor and retailer. In the system under discussion, the manufacturer produces a product and supplies it to the distributor and it is also allowed to direct shipping to supplier facing a deterministic demand but the time span of delivery is relatively short. We develop some scenario to accommodate special policies that minimizes the total cost and subsequently taking into account the loss of flexibility in the condition when the size of order quantity is too big. Model development discussed in this paper is to enable the model to choose not only the distributor but also the manufacturer as a candidate of supplier. The objective function is to minimize the total expected cost of the system. An algorithm is developed to obtain the optimal solution and a numerical example is also included to show the results of the proposed model.

Supply Chain Management: Workforce Education

Regena Scott, Edith Schmidt
Purdue University, United States

The purpose of supply chain management is to facilitate process improvement and satisfy the demands of end-user. "Companies resort to supply chain practices to improve their performance." [1] The role of the supply chain manager is to manage the processes and related activities across all supply chain channel members. Rapid changes in industry and demands for product specialization increase the benefits inherent in effective supply chain management. Strategic process planning, constructive use of resources, effectively managing the organizations human resources and consistent implementation of innovative processes and ideas, are all pivotal elements necessary to construct and manage successful supply chain organization. This paper will discuss the role of a well-educated and well-trained leadership team and workforce and how supply chain education can strengthen the collaborative supply chain.

Experiences from an NSF I/UCRC on Engineering Logistics and Distribution

Babur Pulat, Thomas Landers, Pakize Pulat, Cengiz Altan, Zahed Siddique
University of Oklahoma, United States

The College of Engineering of the University of Oklahoma (OU) embarked on a journey to develop and maintain an I/UCRC (Industry/University Cooperative Research Center) for ten years under the guidance of the NSF (National Science Foundation) on the topic of Engineering Logistics and Distribution (CELDi). CELDi is a multi-university center of excellence promoting collaboration between faculty at various universities and technical professionals in their partner companies to solve logistics and distribution related problems. This paper presents the development, growth, and the graduation of OU's CELDi center from NSF's oversight. We also cite specific development projects, and get into the critical success factors for such centers in the United States. Return on University's investment in the center was 1,898%.

Factor Analysis of Rational Trust among Supply Chain Partners in Indian Industries

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²Dr B.R. Ambedkar National Institute of Technology, India

Primary purpose of this paper is to apply factor analysis on the data collected for Rational Trust; second by to reduce the data collected to a few factors; third, to propose names of the factors and finally to develop a context-related and multi-perspective concept called 'trust' among supply-chain members. A total of 117 responses of questionnaires were collected and analyzed and a number of key findings emerged. The field is relatively "new" one for supply chain management as consensus is lacking on the definition of the term. Factors loading on Rational Trust emphasize to focus on three factors and the proposed name for the key factors of Rational Trust are Economics of relationships, Dynamic Capabilities of Partners & Technology Adoption.

Designing Supply Chain Analysis Tool Using SCOR Model (Case Study in Palm Oil Refinery)

Fitra Lestari¹, Kamariah Ismail¹, Abu Bakar Abdul Hamid¹, Wahyudi Sutopo²

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Business strategies of palm oil supply chain include linkages between plantation as suppliers, milling, refining and customer. Case study on palm oil refinery shows the distribution of product from supplier to customer has a pattern that can be standardized into operational procedures within business processes. This paper aims to present the implementation methodology of SCOR Model based case study on palm oil refineries using the software Process wizard. The methodology can facilitate the blending of business objective, strategy, process and technology in the supply chain. The result shows SCOR templates is very useful tool for the design of a supply chain configuration and also provide the ability to improve the system through best practice projects. It is necessary to note that the software Process wizard can be used as a tool for analyzing configuration operations of the supply chain.

Session	SC 4 Supply Chain Management (4)
Date	12/12/2013
Time	11:00 - 12:30
Room	Ubonchard
Chairs	Lesley Walls, Premaratne Samaranyake

Demand Information Sharing Impact on Supply Chain Management under Demand Uncertainty. A Simulation Model

Ana Paula Barroso, Virginia Machado, Virgilio Cruz-Machado
Faculdade de Ciências e Tecnologia, FCT, Universidade Nova de Lisboa, Portugal
 The modern business environments are subject to uncertainties that can adversely influence the supply chain performance. Demand information sharing between supply chain entities can improve the supply chain performance. To encourage them to share information, the generated benefits need to be comprehensively recognized. Simulation allows doing so.

This paper intends to quantify the impact of the demand information sharing on supply chain management under demand uncertainty. The performance measure used is total costs. A simulation model of the supply chain of a case study was developed in Arena software. Customer demand is modeled by a normal distribution. Four scenarios are simulated with two different standard deviations each one with and without demand information sharing between supply chain entities. The results analysis shows that an increase in the customer demand variability worsens the studied performance measure. However, the introduction of demand information sharing improves the supply chain performance measure.

Models for the Optimization of Supply Chains - A Literature Review

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²*Technische Universität München (TUM), Germany*

Manufacturing firms respond to fierce competition on global markets through a concentration on their core competences. As a result, the competitive position of OEMs depends on the individual performance of their suppliers as well as their arrangement in the supply chain. Against this background this paper presents the results of a literature review on optimization models of supply chains. Thereby, this paper reveals five different categories; deterministic-analytical-, stochastic-analytical-, economic-, simulation- and structural models. Moreover, the 14 models are analyzed against established performance criteria to foster a demand-oriented development of future optimization models for supply chains.

Modeling and Optimization of Inventory and Sourcing Decisions with Risk Assessment in Perishable Food Supply Chains

Zheng Ren, Arjaree Saengsathien, David Zhang
University of Exeter, United Kingdom

Today, the food industries are transforming towards interconnected global networks. Food safety scandals and globalization of food production has sparked heightened public attention to the risks in the supply chain from farms to consumers. In response, it is of great importance that food supply chains consistently provide high quality foods, safety guarantees and transparency. The assessment of the entire food supply chains should now be integrated with risks assessment, food quality and safety management, sustainability and trace ability. For inventory management, the focus shifts from merely minimizing inventory costs, to carefully balancing with wastage and risks exposed. Consequently, this paper proposes a model to determine inventory and sourcing decisions in food supply chains. The model aims to minimize total costs and reduce wastes from unqualified items, while achieving necessary robustness in coping with risks generated. Food quality degradation is integrated in the final model for the purpose of product quality control throughout the food supply chain.

Developing a Two-echelon Inventory Model with Simultaneous Consideration of Backorders and Lost Sales

S. Kamal Chaharsooghi, Hassan Yadegari
Tarbiat Modares University, Iran

One of the most important challenges in inventory control of an efficient supply chain is to minimize logistics costs for each member of the chain. This challenge is even more important when facing non-deterministic demands. In this paper, a divergent two-echelon inventory model is developed to minimize logistics costs (ordering, holding and shortage costs) both for a warehouse and retailers when facing a Poisson stochastic demand. First, a mathematical model is developed which consists of one warehouse and multiple retailers with ordering, holding and shortage costs. The warehouse, similar to the retailers, has both backorder and lost-sales shortage costs simultaneously. This simultaneous combination of backorder and lost-sales shortage costs for both the warehouse and the retailers is the main contribution of this paper towards the research field of divergent two-echelon inventory models. The mathematical model is analytically solved and then validated through simulation. Finally, validity of the model is evaluated by comparing the mathematical and simulation results which indicate the contribution of "percent of warehouse demand with lost sales" and "percent of each retailers' demand with lost sales" parameters affect the total costs of the system.

Decision Trees to Model the Impact of Disruption and Recovery in Supply Chain Networks

Loganathan Ponnambalam¹, Leow Wenbin², Xiuju Fu¹, Xiao Feng Yin¹, Zhaoxia Wang¹, Rick Siow Mong Goh¹
¹*Institute of High Performance Computing, Singapore*
²*National University of Singapore, Singapore*

Increase in the frequency of disruptions in the recent times and their impact have increased the attention in supply chain disruption management research. The objective of this paper is to understand as to how a disruption might affect the supply chain network - depending upon the network structure, the node that is disrupted, the disruption in production capacity of the disrupted node and the period of the disruption - via decision trees. To this end, we first developed a 5-tier agent-based supply chain model and then simulated it for various what-if disruptive scenarios for 3 different network structures (80 trials for each network). Decision trees were then developed to model the impact due to varying degrees of disruption, and the recovery time from these disruptions. Visual outputs of the developed decision trees are presented to better interpret the rules. Supply chain managers can use the approach presented in this work to generate rules that can aid their mitigation planning during future disruptions.

Research on the Formation of Supply Chain Carbon Emission Reduction Union Based on Voluntary Emission Reduction

Yan Peng, Zhuoran Shi
Tianjin University, China

In China, Voluntary Emission Reduction market has been developed and commonly adopted. Enterprise with high energy consumption and high carbon emission can sell emission reductions in VER market after their emission reduction measures. And the promotion of consumer demand caused by low carbon products is considered. This paper we discussed an industry structure of monopoly supplier with high emission and multi-oligarchs manufacturers, with supplier leading emission reduction cooperation. This research shows that supplier by means of deciding unit product reduction rate, and the proportion of reduction investment, and adopting price-discount contract can make all the manufacturers participate in cooperation union and achieve supply chain Pareto improvement.

Session	SC 5 Supply Chain Management (5)
Date	12/12/2013
Time	13:30 - 15:00
Room	Ubonchard
Chairs	Tony Halim, Jenny Backstrand

Using Fuzzy Inference Systems to Improve Purchasing Process-Related Decisions

Javier Puente, Isabel Fernandez, Nazario García, Paolo Priore
University of Oviedo, Spain

Supplier evaluation and selection processes have strategic aspects and implications in the long run for a company. However a literature review surfaces a high number of variables involved in such processes and the variety of different methodologies to be used. In order to overcome the drawbacks present in some methodologies we propose a fuzzy decision system that considers the most significant variables and allows to evaluate and compare new suppliers to historical ones as well as to update the list of the certified ones. This model not only strengthens the operating of the model but also eases the understanding of the process-related knowledge. A survey test is used for validation purposes.

A Comparison of Forecasting Models using Multiple Regression and Artificial Neural Networks for the Supply and Demand of Thai Ethanol

Rojanee Homchalee, Weerapat Sessomboon
Khon Kaen University, Thailand

This paper presented three types of models for forecasting the supply and demand of Thai ethanol, so called MR, ANN, and MR-ANN models. MR models were formulated using stepwise multiple regression analysis, which were statistically significant. However, MR models provided low performance in forecasting. ANN models were constructed using artificial neural networks, which provided satisfactory results. Moreover, the third type of models was an integration of multiple regression analysis and artificial neural networks. In MR-ANN models, influential factors from stepwise multiple regression, were taken as inputs for artificial neural networks. The integrated models provided a fair results comparing to the first two types of models. In summary, ANN models provided the lowest MAPE and the highest R2 indicating that the models were the most appropriate among the three types of models. ANN models are therefore recommended to forecast the supply and demand of Thai ethanol.

Reliability-based Decision Analysis for Ready Mixed Concrete Supply Chain Using Stochastic Method

Jui-Sheng Chou, Citra Ongkowijoyo
National Taiwan University of Science and Technology, Taiwan

The process of delivering ready-mix concrete (RMC) to construction projects is a critical supply chain activity. This study models decision aiding method to assess RMC unloading type involving multiple stakeholders and evaluation criteria. The uncertainty of criteria weights set by expert judgment can be simulated in random ways within a prioritization matrix. The ranking is performed by grey relational grade systems based on individual preference. Using the illustrative example from an engineering corporation, the case study demonstrates the practicability of the proposed method.

A Review of Data Development Analysis (DEA) Applications in Supply Chain Management Research

Woramol Chaowarat¹, Pairach Piboonrugroj², Jianming Shi³
¹*Muroran Institute of Technology, Japan*
²*Chiang Mai University, Thailand*
³*Tokyo University of Science, Japan*

The objective of this paper is to review the application of Data Envelopment Analysis (DEA) in Supply Chain Management (SCM) research including different perspectives and research topics. In this review, academic databases used were ScienceDirect, Scopus and Google Scholar. The later was included to identify unpublished studies, conference proceedings and other types of unpublished studies. Practical review criteria is used for the inclusion or exclusion of the pertinent literature. In total 32 publications were found and analysed in this paper. We found that even though both DEA and SCM were established as a field of study for a long time but there is the only a few study that applied the DEA to SCM. Most of studies applying DEA in SCM did not consider the whole supply chain, only some parts of the chain were analysed. Based on the findings of the review, potential research agendas were developed.

3PL Selection: A Multi-criteria Decision Making Approach

Ankit Bansal, Pravin Kumar, Siddhant Issar
Delhi Technological University, India

This paper presents a fuzzy based approach for 3PL (Third Party Logistics) selection. A multi criteria decision making (MCDM) is used for 3PL evaluation. The MCDM proposal for 3PL evaluation incorporates the decisions of multiple decision makers belonging to the Performance Evaluation Team (PET) constituted by a buyer company. The selection is based on overall score obtained by the 3PL. The fuzzy logic helps in incorporating the vagueness in decision making and enhances the reliability and credibility of the process. An illustrative case is used to demonstrate the methodology. It may prove to be useful for a buyer firm for 3PL selection.

A Bilevel Model for Transportation Service Sharing in Supply Hub in Industrial Park (SHIP)

Xuan Qiu, Gangyan Xu, George Huang
The University of Hong Kong, Hong Kong SAR

Supply Hub in Industrial Park (SHIP) can provide transportation service sharing by dispatching a vehicle to circulate multiple manufacturers to cover their delivery requirements. This paper discusses how Supply Hub in Industrial Park (SHIP) and manufacturers interact to optimize their decisions on transportation pricing and milk-run cycle time, and the delivery schedules of raw materials. This problem is modeled as a bilevel program with the SHIP as the leader and manufacturers as followers. A numerical study is conducted to examine the influence of major parameters.

Session	SC 6 Supply Chain Management (6)
Date	12/12/2013
Time	15:30 - 17:30
Room	Ubonchard
Chairs	Supachart Iamratanakul

A Hierarchical Demand-driven Production Planning and Control Framework for the FMCG Industry: An SAP-based Approach

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¹SAP Deutschland AG & Co. KG., Germany

²Technische Universität München, Germany

This paper presents a hierarchical demand-driven planning framework for the fast-moving consumer goods industry. We develop a planning methodology that is more adaptive to changing customer demand than the typical pull-based planning methods while it reduces inventories compared to the typical push-based planning methods. In an industry where forecast accuracy is often poor, our framework can help reduce inventory costs and avoid product returns and waste. We illustrate benefits of the developed framework in a real-world case study.

The Merging of MPS and Order Acceptance in a Semi-Order-Driven Industry: A Case Study of the Parasol Industry

Watcharee Wattanapornprom, Tieke Li

University of Science and Technology Beijing, China

The main purpose of this research is to demonstrate a newly created paradigm for improving production planning in semi-order-driven industries. The research results provide a clear explanation of the associated planning tasks, the order acceptance and the master production scheduling because their dynamic interactions are essential. Based on an analysis of decision situations among a number of semi-MTO-driven planning settings, we provide a framework consisting of separate interlinked quantitative models for order acceptance and master production scheduling using ATP and CTP while considering the contribution of the modeling and evaluation of both situations in a dynamic setting. Our approach is evaluated through a simulative analysis using empirical data from the parasol industry on web-based ERP using the Linux operation system.

Information Security Risk Assessment in SCM

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In today's business environment, information plays a vital role in supply chain operations. The performance of any enterprise has considerable dependence on the complex information flow across the organization and its network of business partners - both upstream and downstream. This paper discusses some issues related to information security risks in supply chains and puts forward a methodology for the assessment of information security risk.

On Development of Supplier Segmentation Ontology Using Latent Semantic Analysis for Supplier Knowledge Management in Supply Chain

Anirban Kundu, Vipul Jain

Indian Institute of Technology Delhi, India

The trio emerging technology- cloud computing, semantic web and multi-agent systems - has been pivotal in catalyzing the paradigm shift in Information Technology (IT). Despite Enterprise Resource Planning, Supplier Relationship Management systems, and other solutions; current IT systems are unable to extract and share knowledge from text on the web without human intervention. This has made the restructuring of information sharing technique over the supply chain network to be imperative. We have addressed this problem by developing Supplier Segmentation Ontology. We have extracted knowledge from literature on Behavioral Operations in supply chain (from 1934 to 2013) using Latent Semantic Analysis (LSA) to build classes, subclasses and properties of this Ontology. Approximately 11000 articles (title and abstract) from a list of reputed journals (from IEEE Xplore, science direct, and web of knowledge) are considered in LSA. The future scope is to develop Semantic web to enhance supplier knowledge in a supply chain.

Remanufacturing Intermittent Demand Forecast: A Critical Assessment

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¹Nanyang Technological University, Singapore

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In the remanufacturing industry, customer demands and product returns always display irregular intermittent patterns. It is very difficult to accurately forecast such customer demands and product returns. This paper conducts a comparative assessment of the forecasts derived by various methods, and evaluates the robustness of forecasting methodology through the demand data from a remanufacturing company. The results show the econometric methods are more accurate than the classic methods in terms of the mean squared error (MSE).

Sustainable Logistics Systems: A Framework and Case Study

Sooksiri Wichaisri, A. Sopadang

Chiang Mai University, Thailand

The goal of a sustainable logistics system is to improve profitability and long-term environmental impacts. Sustainable logistics systems consider the three perspectives of logistics systems, comprising the economic, environmental, and social approaches. This paper presents a framework for a sustainable logistics system that takes the three perspectives into account alongside sixteen sub-items. The resulting framework offers a basic means of analyzing inputs and outputs, which is applied to a case study.

Session	QC 2 Quality Control & Management (2)
Date	12/12/2013
Time	09:00 - 10:30
Room	Jamjuree
Chairs	Chen-ju Lin, Ayon Chakraborty

Use of Engineering Robust Design Approach to Improve the Surface Quality of Pre-cast Concrete Elements: An Experimental Approach

Samindi Samarakoon, R.M. Chandima Ratnayake
University of Stavanger, Norway

Pre-cast concrete components are commonly used for columns, beams, floors, walls and other structural elements in buildings. In general, several quality control assessments must be performed during the production of pre-cast concrete elements. Further, the quality of any cast product depends on material selection, equipment used and workmanship. The quality of surface finish is one feature which gives an immediate visual impact. In order to minimize life cycle costing for the structure, it is vital to have durable material and formed surfaces with few surface defects (i.e. honeycombing, air void surfaces, etc.). Surfaces of acceptable quality and accuracy are difficult to achieve and depend on functional and aesthetic requirements. However, the end user of pre-cast elements expects a high quality surface finish with minimum defects. It is a great challenge to reduce the occurrence of such surface defects during the production of the elements. This manuscript identifies factors affecting the surface finish of pre-cast elements. It also describes the possibility of using an engineering robust design approach to improve the surface finish of pre-cast elements and explains the experimentation approach.

Reducing Defects and Achieving Business Profitability using Innovative and Lean Thinking

Amol Lanke, Behzad Ghodrati
Luleå University of Technology, Sweden

TRIZ can be considered as a tool of innovative problem solving. In manufacturing domain where quick solution for problem has been developed, methods such as DMAIC, QC story, 8D might take long time to implement and give benefits. TRIZ can overcome this problem with channelized thinking. The case study of this research which was conducted in magnet manufacturing shows that with use of innovative thinking using TRIZ an organization could achieve the quality of product without sacrificing business goals. Cost of quality and cost of manufacturing were both balanced with simple solution to the production problems. Simple innovations lead to increased output capacity and reduction of defects. This contributed to optimize available resources i.e. Achieving LEAN and offer additional product. This case study holds a prime example of TRIZ and how a manufacturing organization can benefit using such a new technique.

A Computational Geometric Approach For A Novel Multivariate Process Capability Index

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Process capability indices are useful tools, which provide common quantitative measures on manufacturing capability and production quality. The existing Multivariate Process Capability indices, MC_{pm}, MCV, MC_f & [C_{pM}, PV, LI] are proposed by different authors for different conditions and situations. Many of the above multivariate process capability indices are based on the ratios of two areas or volumes for bivariate or in multivariate domain respectively. All above proposed indices assume the process to be normal and there by the indices are expressed in the form of ratios of areas of two ellipses or volume of two ellipsoids. When the process does not follow normal distribution the estimation of the index is difficult as the shape of the data distribution will be not known. The proposed MC_{svdd} index uses computational geometry and find out the convex hull of the process data to find the volume. Support Vector Data description helps to find the outliers.

Assessing SMEs Batik Readiness for SNI Adoption (Case Study SMEs Solo and Yogyakarta)

Aries Susanty, Dyah Ika Rinawati, Bambang Purwanggono, Diana Puspitasari, Meylani
University of Diponegoro, Indonesia

The standards adoption gives two types of benefit, i.e. tangible and intangible ones. Related to the adoption of standard, this study proposed framework for assessing the SMEs readiness on SNI adoption which is composed of four critical factors, i.e. perceived national readiness (macro level), perceived industry readiness (meso level), perceived organizational readiness (micro level), and perceived environmental pressure. This study uses an AHP analysis for assigned importance weight of each critical factor and sub-factors in that framework and Likert Scale for measuring each critical sub factor. Then, a total 12 SMEs Batik (6 SMEs from Solo and 6 SMEs from Yogyakarta) participated in the pilot test based on the proposed framework. The result of the study indicated that SMEs Batik has a different level of readiness for SNI adoption. SMEs Batik in Solo more ready than SMEs Batik in Yogyakarta. Compare with small size firms, medium size firms tend to more ready for SNI adoption.

PHM for Complex Mining and Metallurgy Equipment Multi-state System Based Optimal Multivariate Bayesian Model

Jianjun Wu, Shilang Wu, Xiongxiang You
Jiangxi University of Science and Technology, China

A new insight into PHM (Prognostic and Health Management) for complex mining and metallurgy equipment multi-state system based optimal multivariate bayesian model was studied. With an increasing demand in industry in recent years, multi-state system often subject to multiple bottlenecks such as reliability, availability, maintenance, safety, production planning lots, delivering requirement and so on, thus cause PHM theory for complex multi-state system has become an emerging research topic in both industry and academia. This paper is focused on the optimal multivariate bayesian modeling and developing new PHM methodology for complex mining and metallurgy equipment multi-state system. The method incorporates multivariate bayesian model technique to address key challenges and critical issues in exploring new PHM technology for complex mining and metallurgy equipment multi-state system. An illustrative example from a jaw crusher equipment shows this approach can be used to improve PHM's performance in terms of the availability, reliability and maintainability of the complex mining and metallurgy equipment multi-state system as well as lower false alarm rate and cost.

Composite Practices to Improve Sustainability: A Framework and Evidence from Chinese Auto-parts Industry

Zhen Wang, Nachiappan Subramanian, Muhammad Abdulrahman, Chang Liu
The University of Nottingham, China

Sustainable development is increasingly becoming the main objective to organisations. Companies within Chinese manufacturing industries are eager to adopt sustainable strategy through lean, green, and socially responsible practices. This research was carried out to study the effectiveness of various practices that improve the sustainability performance and embraces economic, environmental, and social dimensions. An explanatory case study was conducted in two local Chinese auto-parts companies. Based on literature review and the case study, a framework combining sustainability practices and measures was proposed. Finally, unpopular practices that are effective were identified as significant practice and recommended for business operations.

Session	HS 1 Healthcare Systems & Management (1)
Date	12/12/2013
Time	11:00 - 12:30
Room	Jamjuree
Chairs	Jose Machado

Stand-Alone Electronic Health Record

Julio Duarte¹, Gabriel Pontes², Maria Salazar³, Manuel Santos¹, Antonio Abelha¹, Jose Machado¹

¹University of Minho, Portugal

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Hospitals have made an effort to ensure the permanent availability of data, with the reliance on the information and scalability at the lowest price. Quality and information access speed are guaranteed. On the other hand, information systems become core systems and progressively clinical paper based records has been dematerialized. The single access to information about patients and electronic media, even in critical situations, are now a reality. Despite the efforts referred to above, there remains the possibility of difficulty in accessing information in case of network or electricity failures, or in the event of a local unpredictable disaster. In this paper, we present an extension to the Electronic Health Record, called stand-alone module, to ensure the hospital's access to patient's minimal clinical record in a breakdown scenario.

Analysis of Cross-Platform Development Frameworks for a Smartphone Pediatric Application

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¹University of Minho, Portugal

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The number of smartphone users is growing rapidly, including among healthcare professionals [1]. Together with a pediatrician, it was identified the necessity of a mobile tool to support clinical practice and decision. However, in order to reach the majority smartphone users it is necessary to develop applications for multiple platforms. In this article it is done an analysis of the smartphone market-share, a study of some of the most popular smartphone cross-platform development frameworks and finally selected the best framework to develop a pediatric application.

Quality Improvement of General Out-patient Clinics in Hong Kong

C. M. Chan, T. C. Wong

City University of Hong Kong, Hong Kong SAR

In Hong Kong, general out-patient clinics (GOPCs) which aim to provide primary healthcare service to all residents at an affordable cost plays a significant role in the healthcare system. Recently, the problem of long waiting time in GOPCs has become significant due to high volume of patients and the shortage of medical staff. If this problem cannot be addressed and solved properly, it would deteriorate the service quality. In this paper, the problem of long waiting time in the target GOPC is systematically investigated. Based on the analysis results, some possible remedies are proposed to resolve the problem of long waiting time, and therefore help improve the service quality as well as the patients' satisfaction.

Resource Allocation in Healthcare: Implications of Scarce Resources and Temporal Constraints

Juha Puustjärvi¹, Leena Puustjärvi²

¹University of Helsinki, Finland

²The Pharmacy of Kaivopuisto, Finland

Medical community has taken initial steps towards the computerization of clinical knowledge contained in clinical guidelines. However, often scarcity of clinical resources makes it impossible to carry out clinical guidelines, and the scarcity of resources may delay medical actions from a couple of days to months. A problem here is how to allocate resources among individual patients. In order to automate resource allocation we have extended computer-interpretable modeling languages by modeling primitives that can be used to express whether an action is more or less time critical. In addition, we have extended the expression power of clinical guideline modeling language by transactional features that enable that all required clinical resources for a clinical process can be reserved in an atomic way. This model also minimizes the efforts required for undoing the effects of the canceled clinical reservations.

Relationship between Polymeric Foam Characteristics and Properties of Porous Bone Substitute Fabricated by Polymeric Foam Replication

Wassanai Wattanuchariya

Chiang Mai University, Thailand

Polymeric foam replication is one technique used to produce bone scaffold for porous bone substitution or bone grafting in the human body. This method provides scaffolds similar to trabecular bone, as well as producing a controllable pore size and porosity scaffold. Preliminary studies illustrated that the characteristics of polymeric foam such as pore size and porosity could affect both physical and mechanical properties of the resulting scaffold. Therefore, the objective of this study is to evaluate the relationship of polymeric foam characteristics with the properties of the porous bone scaffold. In this study, 5 different types of polymeric foam were evaluated, and the phosphate glass was implemented as the biomaterial slurry. Scaffold forming took place by immersing the foam types into the slurry and then sintering them at 750 °C for 3 hours. Porosity and compression testings were then used to analyze the physical and mechanical properties of the specimens. Results indicate that the optimal condition of both physical and mechanical properties was found when the polymeric foam with the highest pore density (99.5%) and approximately 300 µm pore size range was used. However, the highest compression strength obtained was only 3.48 MPa, which is at the lower range of the trabecular bone's mechanical properties. Future study will therefore focus on producing stronger porous bone scaffold for porous bone substitution.

A Fuzzy Particle Swarm Optimization Approach for Task Assignment in Home Health Care

Michael Mutingi, Charles Mbohwa

University of Johannesburg, South Africa

Task assignment to healthcare staff in home care services is a complex problem, motivated by the ever increasing home-based care needs. The design of high quality task schedules is critical for maintaining or improving worker moral, job satisfaction, service efficiency, service quality, and competitiveness over the long term. One major objective for improving high quality task schedules is to ensure that the assigned workloads are balanced and are fair among the care givers. Therefore, the desired goal is to reduce workload imbalance as much as possible, while avoiding long distance travels to the patients and violation of the time windows specified by the patients. However, in practice, the desired goal is often subjective since it involves human entities, that is, the care givers, the management, and the patients. The goal tends to be imprecise in the real world. The present paper develops a fuzzy particle swarm optimization (FPSO) approach for task assignment in home healthcare services. The FPSO approach uses fuzzy evaluation based on fuzzy set theory. Results from illustrative examples show that the approach is promising.

Session	HS 2 Healthcare Systems & Management (2)
Date	12/12/2013
Time	13:30 - 15:00
Room	Jamjuree
Chairs	Juha Puustjarvi

Extending a Patient Monitoring System with Identification and Localisation

Fernando Marins, Rui Rodrigues, Carlos Filipe Portela, Manuel Santos, Antonio Abelha, Jose Machado
University of Minho, Portugal

Intensive Care Units (ICUs) are a good environment for the application of intelligent systems in the healthcare area because it requires diagnosing, monitoring, and treatment of patients with critical illness. An intelligent decision support system, named INTCare, was developed and tested in CHP, a hospital center in Oporto. The need to detect the presence or absence of the patient in room, in order to stop the collection of redundant data concerning about the patient vital status led to the development of an RFID localisation and monitoring system - PaLMS, able to uniquely and unambiguously identify a patient and perceive its presence in room, making the process of data collection and alert event more accurate. The solution was the implementation of an intelligent multi-agent system that connects the Patient Management System module, the INTCare module and the RFID equipment, using the HL7 standard embedded in agents behaviours.

Integrating RFID with Blood Supply Chain: A Technical and Business Analysis

Wei Xu¹, Zhaotong Lian¹, Xifan Yao²

¹*University of Macau, China*

²*South China University of Technology, China*

Motivated by the great lack of different blood types in the medical field, this paper mainly considers the inventory management model of blood ordering when the demand fluctuates positively with time, and compares three different inventory ordering strategies: when the information is not shared, each hospital department orders the blood separately; each hospital orders uniformly and centrally and all hospitals jointly order after adopting RFID technology. We focus the analysis on blood inventory cost, ordering cost, RFID technology investment cost and blood deterioration rate. The method of combining quantitative model with qualitative analysis is adopted in this paper to research and analyze the inventory control problem of blood supply chain, striving to form a relatively complete set of blood inventory theoretical frame and theoretical model so as to provide effective decision-making advices for the systematical management of blood.

An Intelligent Approach for Open Clinical Laboratory Results in Intensive Care Medicine

Carlos Filipe Portela¹, Manuel Santos¹, Jose Machado¹, Antonio Abelha¹, Álvaro Silva², Fernando Rua²

¹*University of Minho, Portugal*

²*Centro Hospitalar do Porto, Portugal*

The process of how laboratory tests are made and the results are delivered is very important to the decision making process in medicine. This situation is more critical in areas like Intensive Medicine, where the decision needs to be performed quickly and accurately. Typically, the results are presented in a closed format (document). This format represents a barrier for the implementation of Intelligent Decision Support Systems that make use of laboratory results to feed predictive models to help the Intensive Care professionals in such critical decisions. In order to overcome this limitation an intelligent agent based system has been implemented. Lab results are now collected, processed and used in real-time in an open format contributing to the implementation of an automatic scoring system.

KIDEA : An Innovative Computer Technology To Improve Skills In Children With Intellectual Disability Using Kinect Sensor

Warih Puspitasari Soesaty, Kholifatul Ummah, Ainu Pambudi
Telkom University, Indonesia

Developing life skills in children with intellectual disability is important. To accommodate this needed, it is necessary to provide support either from others or through technology. KIDEA is an interactive learning media solution to improve life skills using Kinect sensor solution that allows users to interact with computers through a natural user interface in the form of movement and sound. Thus, KIDEA would be appropriate to be applied to the development of the brain and nervous suggesting motor movement in children. The KIDEA main objective is to provide media learning of fundamental life skill for children with intellectual disability. With the method of play therapy, it's easier to understand for children with intellectual disability and made them feel happy doing learning through games. In addition, KIDEA is also applied in the solution to improve parent and child relation. With this application, parents can make the learning at home independently and consistently.

A Risk-adjusted Multi-attribute Cumulative Sum Control Scheme in Health-care Systems

Sayyedah Nastaran Shojaei, S. T. A. Niaki

Sharif University of Technology, Iran

Hospitals increasingly use control charts to monitor clinical processes and their outcomes. In medical context, control charts should have stable performance when different patients with different levels of risk enter the hospital. In order to monitor multi-attribute medical processes, we propose a new control chart with entities having different levels of risk. First, risk-adjusted multivariate cumulative sum control chart (RA-MCUSUM) is developed. Then, simulation experiences are performed to demonstrate the application and to evaluate its performance in terms of in-control average run length (ARL₀) stability with the one of a standard MCUSUM chart. The results show that while the standard MCUSUM shows a sensitive performance, the RA-MCUSUM has a robust performance when different entities with different levels of risk enter the system.

Home Healthcare Staff Scheduling: A Taxonomic State-of-the-Art Review

Michael Mutingi, Charles Mbohwa

University of Johannesburg, South Africa

Home healthcare staff scheduling has become increasingly important as healthcare business becomes more service oriented and cost conscious. With the ever increasing home care needs, healthcare staff shortages, increasing world-wide pressure for improved health care, and the rising healthcare costs, developing appropriate models for optimizing home healthcare operations is imperative. Healthcare service providers require effective decision support tools to meet customer expectations in a cost effective manner, satisfy staff requirements such as flexible work shifts, shift equity, individual preferences, part-time work, and meet management goals. Various methods have been developed to solve homecare staff scheduling problems. In this paper, we make a state-of-the-art review of the models and algorithms that have been reported in the literature. In addition, we analyze the existing empirical studies, identifying the research trends and voids in home healthcare staff scheduling. Finally, we identify essential prospective research avenues.

Session	SI 2 Service Innovation & Management (2)
Date	12/12/2013
Time	15:30 - 17:30
Room	Jamjuree
Chairs	Ching-Yu Lien, Marivic Manalo

Adopt-A-Community Framework

Romeo Manalo¹, Marivic Manalo²

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This paper is about a framework that would facilitate economic progress in some of the poorest communities in the Philippines. Top corporations operating in the country can extend their social responsibility initiatives and at the same time get tax credits for worthy endeavors. The idea is for big businesses to adopt communities and make them progressive members of the nation. An adopted community can be a town or a barrio or part of a barrio, which belongs to the poorest areas in the country.

Adopt-A-Community Framework will eliminate or minimize some ills of the society such as unemployment, overpopulation of urban areas, crimes, poverty, etc. The ultimate goal is to help rural folks become productive and responsible members of the community and build their self-worth.

Process Improvement – A Positive Deviance Approach

Ayon Chakraborty

James Cook University, Singapore

Corporate efforts to improve the bottom line traditionally focus on shortcoming and issues. A comprehensive set of analytical tools and methodologies (e.g., Lean Management, Six Sigma) have been developed and are deployed in attempts to fix identified problems). However, little guidance is available on how to actually come up with improved organisational and process designs. Organisations tend to rely on approaches such as brainstorming that do not lead to consistent and reliable outcomes. It is proposed to benefit from conducting a dedicated study on internal sources for business improvement. This so-called positive deviance approach utilises internal best practices and converts successful, but hidden best practices into widely deployed, corporate practices. The paper develops an approach to identify exceptional performers and map their behaviors and activities which made them successful. The objective was to identify practical quick wins which can be implemented through existing account auditing activities.

The Conceptual Model of Negative Experiences Regarding the Facilities at Family Trip Destinations - A Case Study of Tourism Factories

Hsin-Yen Wu¹, Ching-Yu Lien²

¹Yu Da University, Taiwan

²Minghsin University of Science and Technology, Taiwan

By means of qualitative research methods, this study investigated the factors of negative experiences at different times regarding family trip destinations to explore the tourism experiences and the factors affecting negative experiences among family members. This study further probed the experiences of family members generated by tourism factories, thereby establishing a conceptual model regarding the negative experiences of family trips.

Dynamic Pricing in Performance Theater Industry: An Empirical Study

Naragain Phumchusri

Chulalongkorn University, Thailand

In recent years, revenue management (RM) have played an important role in driving more profitability for industries selling perishable products with fixed amount of resources and different customers are willing to pay a different price for each of them. While dynamic price has been widely used in airline and hotel industry, a smaller number of researches explore the existence of dynamic pricing behaviors in non-travel industry. This paper investigates effects of relevant factors such as timing and realized demand on the performance ticket prices. While previous empirical studies related to performance ticket prices rely on the aggregate data and have not focused on exploring how the price changes during the selling season, this study uses detailed transaction sales obtained from 117 classical concert tickets, enabling the study of dynamic pricing structures. Three different models are compared: Ordinary Least Square, Random Effect and Fixed Effect models. The results indicate that Fixed Effect is the most appropriate model as compared to others. We found that day of shows, i.e., Saturday shows are significantly priced higher than others. The tickets of shows during the end of the season (during February to April) have lower prices compared to the beginning. We found timing in the selling period has significant impact on ticket prices. In particular, ticket price is lower when it is closer to the show date and a large amount of discount occurs right before the show starts.

Quantifying the Service Level and Manpower Needs of Food Courts in Singapore

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It is predicted that the current manual collection of crockery will gradually be replaced by the selfreturn of used utensils in order to reduce the manpower needs in Singapore. However, no existing methods are available to quantify service level of the cleaning staff and optimize manpower needs for food courts in Singapore. To measure the range of service level provided by cleaners during peak hour in food courts in Singapore, a Service Level Quantifying (SLQ) model is proposed in this paper by investigation of the relationship between customers' return rate, the seating capacity at peak hours and the general efficiency of cleaning staff. Monte Carlo method was applied to further refine the proposed SLQ model. The results obtained via this model are consistent with the observations at NUS canteens as there are rare occurrences of buffer overflow at the collection points. This model can be used by food court managers and the National Environmental Agency of Singapore (NEA) to effectively plan and simulate manpower needs before their on-site deployment.

IMU-WPS Hybrid Position Estimation Test-Bed Development

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Lately, a range of applications of the LBS(Location Based Service) is being extended to indoor position estimation. This investment is caused by a huge expectation about the bright prospect of indoor LBS market, including mobile advertisement. Indoor position estimation is now being studied with various methods. Among them, the central field of indoor estimation method by using smart-mobile sensors. However, this method has its limitation within an urban environment because of sensing obstructions. To overcome the limitation of the IMU-based method, we determined the need of a combination of the IMU-based method, an infra-based estimation method and a hybrid design. So, we will use hybrid IMU-based method and a wireless infra method.(WPS)

Session	SM 2 Systems Modeling & Simulation (2)
Date	12/12/2013
Time	09:00 - 10:30
Room	Sakthong
Chairs	Kun-Ming Yu, Ling Cen

Detecting Hierarchical Community Structures in Social Networks Using Integer Linear Programming

Chun-Cheng Lin¹, Jia-Rong Kang¹, Jyun-Yu Chen¹, Chien-Liang Chen²

¹National Chiao Tung University, Taiwan

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Detection of hierarchical community structures is one of the most crucial tasks for analyzing complicated social networks. In a hierarchical community structure, the super node at a higher level represents a nested structure so that the relationship of subcommunities in a community can be observed. Most of the previous works focused on designing metaheuristics for detecting hierarchical community structures, which may be computationally efficient, but cannot always guarantee the community partition optimality. Hence, this paper proposes an integer linear programming model for detecting the hierarchical community structure in social networks, which takes into account the number of levels and the limit of community size of each level. Our experimental results show that our model can find a reasonable hierarchical community structure, where the interaction between communities at different levels can be comprehended more clearly.

Simulation Modeling Analysis to Support Decision Making of Cassava Harvesting in Thailand

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This paper involves a simulation modeling of cassava harvesting and selling practice. Cassava farmers mostly make selling decisions based on experience. These decisions include harvesting cycles, which vary from eight months to 18 months; and selling practices, which are selling based on weight and selling based on percentage of starch. Making both decisions that leads to a maximal profit is difficult when several factors, such as cassava market price, cassava yield (amount and percent starch), and market conditions, that impact the decision outcome contain variability. Simulation modeling is an effective tool for decision analysis under such uncertainties. The objective of this study is to develop a simulation model that can provide guideline for making these decisions. A model verification is conducted and the results show that the model logics are correctly constructed and that the model can be used to evaluate different harvesting cycles and selling practices for further analysis.

Development of an Assessment Procedure for the Problem-Specific Selection of Most Suitable Modeling Methods for Complex Systems

Daniel Kasperek, Konrad Peters, Sebastian Maisenbacher, Maik Maurer

Technische Universität München, Germany

Currently there are hundreds of known modeling methods that are applied to countless problems in engineering. A purposeful selection of the right modeling methods is crucial for successful problem solving. However, adequate procedures for the problem-specific selection of most suitable modeling methods are missing. The selection of suboptimal modeling methods often leads to increasing costs, development time, and an inferior design of products. Based on a review on existing procedures, a concept for an assessment procedure for the problem-specific selection of most suitable modeling methods is developed and implemented. Main steps for the procedure are identified, the concept of classification-domain-trees is developed and a customized vector space approach is used for the selection of the most suitable modeling methods. The evaluation study shows that the developed concept is applicable and that appropriate problem-specific modeling methods can be reliably identified by using the implemented concept.

Optimum Design and Analysis of Riser for Sand Casting

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Solidification of metals continues to be a phenomenon of great interest to physicists, metallurgists, casting engineers and software developers. It is a non-linear transient phenomenon, posing a challenge in terms of modelling and analysis. This paper attempts to study heat flow within the casting, as well as from the casting to the mould, and finally obtains the temperature history of all points inside the casting. The most important instant of time is when the hottest region inside the casting is solidifying. ANSYS software has been used to obtain the last solidifying region in the casting process by performing Transient Thermal Analysis. Location of the hot spot predicted by software simulation showed good agreement with the experimental trial. It was also observed that the simulation of casting helps in obtaining optimum design of riser.

A SIS Epidemic Model with Impulsive Vaccination

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¹University of Basque Country, Spain

²Autonomous University of Barcelona, Spain

This paper studies a time-varying SIS (i.e. containing susceptible and infected populations) propagation disease model exhibiting a nonlinear incidence rate and impulsive eventual culling of both populations so that the individuals recover with no immunity to the disease. The nonlinear incidence rate consists of two time-varying additive terms proportional to the susceptible and infected populations normalized to the total population.

Representing Ontologies in Multiple Domain Matrices

Daniel Kasperek, Ragna Steenweg, Sebastian Maisenbacher, Kathrin Jasmin

Füller, Helmut Krcmar, Maik Maurer

Technische Universität München, Germany

Structural Complexity Management (SCM) is an approach to handle complex systems. The amount of time spent for the modeling of the necessary Multiple Domain Matrices (MDM) is high due to extensive information acquisition procedures such as individual workshops. The use of data which is already available within companies is an approach to shorten the information acquisition phase. Due to their broad use in industry for knowledge capture, ontologies may serve as a basis for MDM modeling and thereby for complexity management. This paper presents a method for the representation of ontologies using the Web Ontology Language (OWL) syntax in MDMs. A tool for the automated transformation of the OWL code into code usable for existing MDM software solutions is introduced to facilitate the transformation of ontologies into MDMs. This is followed by an exemplary application of the transformation method implemented in the tool.

Session	QC 3 Quality Control & Management (3)
Date	12/12/2013
Time	11:00 - 12:30
Room	Sakthong
Chairs	Jianjun Wu, Shinji Inoue

A New Method for Metrology Monitor Charts

Jinyi Ma, Kaily Cao, Weiting Kary Chien

Semiconductor Manufacturing International Corporation, China

In this paper, a new method to set the spec (specification) limits for measurement data from metrology tools is introduced. Combining the accuracy spec guaranteed by metrology vendors, the metrology tool's actual performance, and the inline measurement requirement according to MSA (Measurement System Analysis) spirit, we've not only studied the proper method but also standardized the control flow to define the spec limits. Through such categorization and characterization, we can identify different situations to set the proper spec limits. This method can be applied as one of the release criteria for new metrology tools at the certification stage, and be further applied as one of the routine review flow for tool performance checking.

Critical Practices in TQM Human Resources Development

Masayoshi Ushikubo¹, Hisato Tashiro², Nobuzumi Fujii¹, Kazuya Nakajima¹, Ichiro Sakata²

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Abstract – Total Quality Management (TQM) is a series of organizational actions. In this paper, we analyze the critical practices in TQM leadership development of a global manufacturing company. We surveyed 142 departmental managers with self-evaluation questionnaire on leadership development and analyzed the data with factor analysis and an Automatic Interaction Detection (AID) method to find critical behavioral emphasis. TQM leadership with vision, high aspiration, and scientific quality control made difference for effective leadership development.

Keywords - Total Quality Management (TQM), Human Resources Development, Automatic Interaction Detection (AID), Scientific Quality Control, Visionary Leadership

An Enhancement for Single Sampling Plan Method

Randy Kang, Lisa Yu, Weiting Kary Chien

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Acceptance sampling has been widely used as a quality control technique in industry. A standard single sampling plan consists of 3 switchable inspection plans: Tightened, Normal and Reduced [1]. It means the 3 inspection schemes can be switched from one to another based on predetermined successive products' quality. Theoretically, higher quality of successive lots or batches has high probability of acceptance, and vice versa, lower quality of products will suffer from high reject ratio. However, how about the switch rule works? How to adjust the switch rule to meet requirements of manufacturing and cost? In this paper, we simulate the acceptance probability with different class of defects or defectives in a standard single sampling plan using a self-developed program. And using this program, we investigate the actual inspection cost and both producers' and consumers' risk with a variety of switch rule. An optimized single sampling plan is proposed based on the results of design of experiment (DOE). The sampling plan is more economic and effective to manufactories.

The Quality Control Application for Abnormal Raw Material Early Detection

Violet Shangguan, July Shui, Kevin Chang

Semiconductor Manufacturing International Corporation, China

Raw material quality control is one of the most important subjects for foundry manufacturing process with the advancing of semiconductor technology into nanometer nodes. Therefore, how to effectively detect abnormality at the early stage of raw material incoming or even at supplier sites become one more challenge topic. The successful early detection can reduce foundry manufacturing risk and cost. This paper will focus on the application of quality control method on both suppliers and foundry. The purpose is to reduce foundry manufacturing risk by implementing the best quality control methodology on raw material manufacturing process at supplier site and the early detection of nonconformance in raw material incoming inspection stage at foundry site

Total Productive Maintenance Strategy in a Semiconductor Manufacturer: A Case Study

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³*Multimedia University, Malaysia*

The role of maintenance in manufacturing has become more crucial and important in today's competitive environment. It is estimated that maintenance cost contributed approximately 10-30 percent of total operation cost. In order to stay competitive, manufacturing companies are forced to introduce production improvement programs to increase both quality and productivity. Total productive maintenance (TPM) is a well-known and very useful methodology which allows manufacturing firms to attain near ideal conditions with zero downtime, zero defects and zero accident. The objective of this paper is to study the effectiveness of TPM implementation in a multinational semiconductor manufacturer. In this study a bottleneck process from the production line was chosen and continuous improvements were implemented to improve equipment effectiveness. The results achieved are very encouraging in the reduction of equipment downtime, improvement in overall equipment effectiveness, employee motivation and reduction in number of accident rate at the shop-floor.

Quality Control of Subcontractor Management in Wafer Foundry

Wenwen He, Kelly Yang

Semiconductor Manufacturing International (Shanghai) Corp., China

Semiconductor manufacturing process is becoming more and more complex. Therefore, many integrated circuit design houses are transforming direct supply chain management to wafer foundry subcontract management for backend supply lines. The service provided by foundry is known as turnkey service. To ensure the quality of packaged product, a robust backend subcontractor quality control system is quite important for foundry. In this article, we introduce the establishment of the quality system, which includes the stages of subcontractor qualification, production monitoring, and periodical review. The methodologies used in each stage are described. The collaboration between foundry and backend subcontractor enhances the supply chain operation. The overall quality level meanwhile has been significantly improved.

Session	PP 2 Production Planning & Control (2)
Date	12/12/2013
Time	13:30 - 15:00
Room	Sakthong
Chairs	Tatsushi Nishi, Yuan Huang

Operational Control of Service Processes: Empirical Evidence from the Financial Sector in Australia

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²Queensland University of Technology, Australia

³James Cook University, Singapore

As customers of financial service providers not always provide the required information on time, operational control has to be conducted. Thus, companies have to deal with daily decisions of how to process incoming orders to perform well in terms of quality, cycle time and cost. Due to a lack of empirical research, we start gathering evidence by identifying the state-of-the-art in financial services companies in Australia. The research includes ascertaining which concepts and mechanisms are used for operational control and which characteristics influence their usage. The results reveal that operational control is mostly conducted ad-hoc as forecasts and predefined rules are rarely used. In-depth interviews uncover opportunities to install a more forceful operational control. However, certain criteria such as organisational grouping of employees within the process should be considered as these criteria influence the effectiveness of operational control.

Quantifying the Impact of Using Multi-function Robots on Productivity of Rotationally Arranged Robotic Cells

Mehdi Foumani, Yousef Ibrahim, Indra Gunawan

Monash University, Australia

This paper investigates the scheduling of a rotationally arranged robotic cell with the Multi-Function Robot (MFR). The earlier known robotic study in this area assumed that the robot only moves the part between machines. We lift this assumption on robot tasks and assumed a special class of robots which is also able to perform a special operation in transit. The aim is to find a minimum cycle time for identical part production. Considering additive and constant travel-time, the distance between any two machines is varying or constant based on the robot acceleration/deceleration for incompact and compact cells. The lower bound of the cycle time is deduced to evaluate the optimality of two practical permutations namely uphill and downhill. It also identifies the regions where using a Multi-Function Robotic Cell (MFRC) is more economical than a Single-Function Robotic Cell (SFRC).

Analysis of the Effects of Flexibilities on Scheduling A Flexible Manufacturing System Using Discrete-Event Simulation

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This paper focuses on a simulation-based experimental study of the effects of routing flexibility, sequencing flexibility and part sequencing rules on the performance of a typical Flexible Manufacturing System (FMS). Three Routing Flexibility Levels (RFLs), five Sequencing Flexibility Levels (SFLs) and four Part Sequencing Rules (PSRs) are considered for detailed investigation. A discrete-event simulation model is developed to describe the operation of the FMS. The performance of the FMS is evaluated using measures related to flow time and tardiness of parts. The statistical analysis of the simulation results reveals that there is a significant interaction among RFL, SFL and PSR for all the performance measures.

A State-of-the-Art Workload Control System for Customized Industry

Yuan Huang

University of Southampton, United Kingdom

Bespoke manufacturing strategies, such as Make-To-Order, are increasingly employed by individual companies as well as supply chains competing on customized products/services. Uncertainties from individual requirements greatly increase the complexity of the operation and production process, making planning and control activities extremely difficult. Workload Control (WLC) is a Production Planning and Control (PPC) approach uniquely designed for customized industry. However, implementation of WLC has encountered significant difficulties due to the gap between theory and practice. This paper describes a state-of-the-art WLC Decision Support System (DSS) which is considered an effective enabler of WLC application. To address the practical challenges (e.g., lack of quotation support, unexpected incoming of workloads) noted in the literature, the system has been developed through a user interactive action learning and reflection environment called 'living lab'.

Requirement Derivation for the Factory Planning in the Automobile Industry through Strategic Scenario Generation

Egon Mueller¹, Mario Münnich², Jens Kellerbach², Siegfried Fiebig²

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²Volkswagen AG, Germany

The article describes an approach for modeling a general method to deduct the factory requirements from a financial view. An aggregated model of the SADT-method with five process steps is visualized at the beginning. In addition to a short description of each process step, the article focuses on generation of meaningful scenarios including automobile volume forecasts. Therefore, the essential criteria and premises are taken into account via several influence factors. Finally, by using the counter-current process, economical requirements on the factory planning can be worked out in each scenario.

An Integrated Production Planning and Order Acceptance Model with Flexible Due Dates

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²University of Sharjah, United Arab Emirates

A particular single stage production planning problem is considered in this paper. The problem consists of integrating sales with production planning decisions by allowing the production planner to choose the best orders to accept based on their profit and the available capacity. The resource capacity is considered in a more realistic way compared to classical models. Based on this, three models are suggested: a production planning problem with back ordering which does not consider integration of decisions, an integrated model that allows order acceptance decisions, and finally an order acceptance model with flexible due dates on customer orders. Initially, the models are solved using a commercial solver in order to show the effectiveness of choosing integration of decisions and order due date flexibility. We show in the results how important is the latter model and we propose a heuristic to solve it. The results show that the heuristic is very promising.

Session	PP 3 Production Planning & Control (3)
Date	12/12/2013
Time	15:30 - 17:30
Room	Sakthong
Chairs	Seng Fat Wong, Michael Leyer

A Mathematical Model on an Economic Lot Scheduling Problem with Shifting Process and Joint Material Replenishment

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²*Bradley University, United States*

³*Shih Chien University, Taiwan*

This paper focuses on developing a mathematical model for solving the Economic Lot Scheduling Problem (ELSP) under an imperfect (shifting) process that includes joint material replenishment, in-production screening process, imperfect rework process, scraps and shortage. The Common Cycle (CC) approach is applied for the problem formulation. Although this paper only demonstrates the first step, further research works will be on conducting effective problem solving procedures.

Parallel-machine Scheduling with General Positional Deterioration and Maintenance

Shijin Wang

Tongji University, China

We consider the parallel machine problem with generalized positional deterioration effects and multiple maintenance activities to minimize the total workload. The decision is to determine jointly the optimal assignment of jobs on each machine, the optimal maintenance frequencies, the optimal positions of the maintenance activities, and the optimal job sequences on each machine. The deterioration rates of job processing times on machines are represented by a general non-decreasing function and the maintenance activity is not necessarily perfect. The problem is modeled as a rectangular assignment problem and we show that the problem can be optimally solved at most in $O(n^m+4)$ time. An illustrative example is used to show the computational procedure.

Critical Mapping of Sustainable Index Methodologies

Marco Taisch, Jing Shao

Politecnico di Milano, Italy

This paper has derived from empirical generation methodologies of indexes which are mainly focus on sustainability or environmental performance and provided critical mapping for these indexes originally. By categorizing indexes from several dimensions, we suggested an analyzing approach as innovator for new researchers to find new research questions and gaps. This approach is along determinants which include categorization, constructing steps and contents analysis of indexes. Finally, suggestions for development of future theory and research are offered.

Lagrangian Relax and Fix Heuristics for Integrated Production Planning and Warehouse Layout Problem

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¹*Osaka University, Japan*

²*University of Windsor, Canada*

³*University of Toronto, Canada*

We present a real world production warehousing case, where the company always faces the challenges to find available space for their products and to manage the items in the warehouse. We develop a decomposition algorithm to solve a mixed integer programming formulation of warehouse layout with capacitated lot sizing problem. The problem with real data is a large scale instance that is beyond the capability of optimization solvers. We propose a Lagrangian relax and fix heuristics to solve the problem efficiently. Computational results demonstrate the effectiveness of the proposed method by comparing the performance of the proposed method and branch and bound method.

The Production Planning of Pharmaceutical Production Under Multi Variables.

Suleeporn Chaolaem¹, Tuanjai Somboonwivat², Suksan Prombanpong²

¹*Government Pharmaceutical Organization, Thailand*

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The objective of this paper aims to optimally schedule and dispatch production plan of pharmaceutical products. The production of this product is deemed complex and must rigidly comply with regulations such as GMP, PIC/S (Pharmaceutical Inspection Co-operation Scheme) and so on. Thus, certain procedures such as setup and clean up when changing production are inevitable in order to avoid contamination on the product. However, it is time consuming process. Therefore, scheduling of the production must also consider batch to batch change and other constraints as well. In this paper the mathematical model is developed to formulate the problem and the mixed integer linear programming is utilized to obtain an optimal solution.

Improving The Efficiency of Ordering Policy: An Application In a Class-A Spare Part

Chivalai Temiyasathit, Natthanun Jangsetthagul

King Mongkut's Institute of Technology Ladkrabang, Thailand

Statistical analysis of inventory data has been widely used to investigate the behavior of demand, the order execution and the delivery data in business industry. The analysis benefits the supplier in many ways. This study focuses on statistical analysis of spare part management of Water Purifier's electronic modules. The challenge of this demand prediction is that the electronic modules have random failure as well as an uncertain delivery lead time and delivery quantity. Without implementing the ERP system, the spare part ordering policy is an intuitive-based order. The present study investigates the suitable forecasting method for electronic module in after-Sales service department in Thailand. A study of probability distribution is incorporate in order to define sample probability distribution of uncertain delivery lead time and quantity. The new ordering policy based on a defined probability distribution is proposed to facilitate the elimination of intuitive-based ordering system, minimize the stock level, and improve the inventory management and control strategy. The results with real inventory data showed that our proposed policy achieved satisfactory stock level as well as significantly reduce inventory cost while maintain a high customer service level.

Session	PM 2 Project Management (2)
Date	12/12/2013
Time	09:00 - 10:30
Room	Patumchard
Chairs	Norbert Trautmann, Pawel Blaszczyk

Matrices-based Modeling of Communication within Planning Projects

Bernd Petrus, Roman Arnold, Ralph Riedel, Egon Mueller
Chemnitz University of Technology, Germany

Within planning projects the planning of communication often is an underestimated complexity factor. Addressing the need for methodological support this paper presents a matrices-based model which supports the planning of communication. Basically the communication model aims for structuring the dependencies between planning participants, planning tasks and planning information respectively content, based on the essential basics of Design Structure Matrices. It allows a differentiated communication analysis by providing a high level of transparency, by adapting to project specifics and, thus, by making different evaluations possible. Furthermore a novel area of application for Design Structure Matrices is introduced with reference to the social-communicative structuring of communication within the scope of the presented model.

The Identification of Limiting and Enabling Factors of the Organization on the Development of Platform-based Products

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Efficient und successful development of platform-based product architectures requires a thorough understanding of the organizational structure, its interaction with the product architecture and the development processes. As individual research papers in existing literature are mostly focused on single aspects of the organizational domain, an overview of possible influencing factors on platform-based product development is missing. This paper addresses this gap by thoroughly reviewing the literature to identify and categorize the relevant limitations and enablers that influence success of platform-based product architecture development.

Activity-based Process Model for Customer-driven Product Development

Anita Friis Sommer, Iskra Dukovska-Popovska, Kenn Steger-Jensen
Aalborg University, Denmark

Due to increased customer demands and shortened product life cycles, industrial mass producers receive an increasing amount of customer requests. The requests have various degrees of complexity requiring engineering changes to existing products or development of new products depending on the nature of the request. Managing this process is termed customer-driven Product Development (PD). In order to increase process performance, an activity-based process model should be utilized. However, existing process models do not consider this special case of integration between collaborative PD and customer-initiated engineering change management. Thus, the purpose of this study is to explore customer-driven PD to develop new insights into an increasingly relevant PD process. The paper includes an embedded case study of a large industrial mass-producer and its customers. The paper contributes to existing research proposing a process model for customer-driven PD adding new knowledge to PD research.

Deliberating the Triple Constraint Trade-offs as Polarities to Manage – a Refreshed Perspective

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It has become the norm in many projects to view the traditional trade-offs as classic problems to 'solve'. This approach often suppresses the creative exploitation of paradox within the triple constraint. The principles and practices of Polarity Management™ introduce a refreshed perspective by supporting the 'either/or' problem solving approach with the 'both/and' rationale, which allows the triple constraint trade-offs to be held in respectful dialogue. Without the effective management of the triple constraint as an interrelated system, projects run the risk of becoming separated from purpose. This paper undertakes to explore the dynamics of the triple constraint by considering their 'mutualities' as polarities to manage in order to bring a refreshed perspective to the time vs. cost vs. scope dilemma. An integrated model is proposed that considers the exploitation trade-offs as polarities to manage in an effort to sustain an optimum compromise as a function of the anticipated project outcome.

Construction of Ecological Niche Model of Projects under Management by Project Pattern in Enterprise

Kexin Huang

Northwestern Polytechnical University, China

How to select and combine different types of project become the key problem of enterprise resource allocation when enterprise management mode is oriented by Management by Projects (MBP). Project is provided with ecological niche in enterprises. From the perspective of "ecostate" and "ecorole", this paper divides the ecological niche of the project into environment support capability, project execution capability and project competition capability and six corresponding dimensions. Then a qualitative ecological niche model under MBP pattern of enterprise is established, hoping to offer a new clue for projects selection and configuration under the MBP pattern of enterprise.

Scrum Integration in Stage-gate Models for Collaborative Product Development - A Case Study of Three Industrial Manufacturers

Anita Friis Sommer¹, Andreas Slavensky², Vivi Thuy Nguyen¹, Kenn Steger-Jensen¹, Iskra Dukovska-Popovska¹

¹*Aalborg University, Denmark*

²*AN-Group A/S, Denmark*

The relevance of collaborative Product Development (PD) is rising with the decrease of product life cycles combined with growing customer demands. Industrial manufacturers now experience competition in the global market where differentiation is necessary for survival. Hence, in order to differentiate from low-cost competitors and increase PD performance, some industrial manufacturers now seek competitive advantage by experimenting with new ways for collaborative PD. This includes integrating customer-focused agile process models like Scrum from the software industry into their existing PD models. Thus, instead of replacing traditional stage-gate models, agile methods are currently integrated in existing PD models generating hybrid solution for collaborative PD. This paper includes a study of three industrial cases that have successfully integrated Scrum into the stage-gate process model for collaborative PD. The paper introduces the three functional hybrid models, including the impact on PD performance, PD roles and customer collaboration.

Session	EE 2 Engineering Economy & Cost Analysis (2)
Date	12/12/2013
Time	11:00 - 12:30
Room	Patumchard
Chairs	Hsiao-min Chuang, Michael Gepp

Functional Assessment for Large-scale Wind-hydrogen Energy Integration Electricity Supply System in Taiwan

Pao-Long Chang, Chiung-Wen Hsu, Chih-Min Hsiung

Feng Chia University, Taiwan

This study constructs an application scenario of a large-scale wind power and hydrogen energy integrated electricity supply system (LWHIESS) in Taiwan, and conducts a system functional assessment for LWHIESS. This includes an estimation of LWHIESS's effectiveness for increasing the available power and reducing carbon emissions. Assuming that in 2025, Taiwan's wind power installed capacity would become 3,000 MW, the results showed that after incorporating electrolyzed hydrogen generation, hydrogen storage and fuel cell equipment into Taiwan's wind power system, the useable power would be increased by 5%-7%, and carbon emissions would be decreased by around 240,000 ton annually for the overall power supply system when electrolyzer efficiency, fuel cell power generation efficiency and the power consumption ration for hydrogen generation were high. It also showed that a power supply capacity of 200-220 MW with the installed capacity of onshore wind turbines would be increased after renewing them electric power.

Model for Integrated Value Engineering

Sebastian Maisenbacher, Florian G. H Behncke, Udo Lindemann

Technische Universität München, Germany

The approaches of target costing and value engineering support product development processes in identifying target costs from a customer perspective and in improving the value cost ratio of a product. This research introduces the approach of Integrated Value Engineering, which combines both approaches in one model. In the Model for Integrated Value Engineering the three levels components, functions and requirements of a product are modeled in a matrix and target costs from requirements and current costs of components are assigned to each other on all three levels. This allows a holistic comparison of the current costs with customer based target costs and easily highlights potentials for cost reduction or adding value. The approach is evaluated by an academic and an industrial case study.

Revenue and Utility Maximization under Centralized Dynamic Spectrum Allocation

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In order to utilize the spectrum resource more efficiently, with the development of cognitive radio technologies, dynamic spectrum allocation has been viewed as a promising approach to increasing spectrum usage and efficiency. With dynamic spectrum allocation, wireless service providers that operate in fixed spectrum bands allocated through static allocation can solve their short-term spectrum shortage problems. Dynamic spectrum allocation mechanisms should be coupled with dynamic pricing schemes to achieve efficient allocation. We model the dynamic spectrum allocation problem with a centralized spectrum broke as a multi-stage non-cooperative dynamic game. In this spectrum trading game, all players' behaviors and dynamics need to be taken into consideration. Furthermore, we present an economic framework and propose a centralized spectrum allocation mechanism to optimize spectrum allocation. The simulation results show that the centralized spectrum allocation mechanism with dynamic pricing achieves dynamic spectrum allocation that is responsive to market conditions.

Challenges of Performance Assessments for Engineering Departments: Empirical Study and Further Results

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This contribution extends the results of an empirical study in the German plant manufacturing industry by a root cause analysis. Engineering plays a central role in the industrial value chain. Current assessments however do not consider its multiple impact in an adequate way. Since there is little literature about this topic - existing publications analyze performance from a technical-functional perspective or focus on design aspects - this study aims to evaluate performance criteria and challenges for performance assessments. 36 experts in the domain of plant engineering have been asked in a survey and personal interviews. Totally 13 challenges could be identified which oppose comprehensive assessments of engineering performance. A subsequent root cause analysis of these challenges - based on nine expert interviews - identified management practices, friction between technical and commercial functions in organizations and an unclear value proposition of engineering as underlying problems.

The Optimization of Maintenance Time and Total Site Crew for Base Transceiver Station (BTS) Maintenance Using Reliability Centered Maintenance (RCM) and Life Cycle Cost (LCC)

Rohmat Saedudin, Rino Andias Anugraha, Rachmad Eka

Telkom Institute of Technology, Indonesia

In a telecommunications network architecture, BTS holds a very important role. In the event that causes disruption of BTS and BTS to be down, it will result in loss of potential revenue and lead to loss of consumer loyalty in the company. Hence the need for an effective method of treatment BTS and BTS efficient so that availability can be maintained properly.

The method used in the treatment of BTS in this study is the RCM method (Reliability Centered Maintenance) to determine treatment priorities of existing equipment in the BTS based on vital functions and data destruction in order to obtain its value MTTF and MTTR, as well as LCC method (Life Cycle Cost) to determine the optimal number of sites crew for treatment BTS.

By using the RCM method, the results of the determination of the critical components based on damage data, are obtained two set of equipment as critical components. They are generator and transmission module BCKM. Calculation and data processing of field data acquisition and secondary data the previous year, the value of the MTTF BCKM module is 1109.635 hours and MTTR BCKM 6,095 hours, while the value of the generator is 1647,373 hours MTTF and MTTR generator is 3.6 hours. While the number of site crew required in the BTS treatment based on the results of calculation and data processing with the LCC method, obtained the most optimal amount based on the cost is 4 site crews.

Session	IP Information Processing & Engineering
Date	12/12/2013
Time	13:30 - 15:00
Room	Patumchard
Chairs	Antonio Grilo, Xu Zhang

Scalable Clustering with Adaptive Instance Sampling

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³Howon University, South Korea

Most of the clustering algorithms are affected by the number of attributes and instances with respect to the computation time. Thus, the data mining community has made efforts to enable induction of the clustering efficient. Hence, scalability is naturally a critical issue that the data mining community faces. A method to handle this issue is to use a subset of all instances. This paper suggests an algorithm that enables to perform clustering efficiently. This is done by using nested partitions method for solving the noisy performance problems, which arises when using a subset of instances and adjusting the sample rate properly at each iteration. This Adaptive NPCLUSTER algorithm had better similarity in small dataset and had worse similarity in large dataset than NPCLUSTER, but it had shorter computation time than NPCLUSTER.

Integrated Information Modeling of Engineering Digital Prototyping for Satellite Design

Xu Zhang¹, Kai Wang¹, Haoqi Wang¹, Zheng Xie²

¹Beijing Institute of Technology, China

²China Academy of Space Technology, China

The design and development of aerospace product is a collaborative multi-discipline project. The integrated and consistent information modeling of all the information, models, documents and other product data generated during design and development is critical to success. An integrated information model, defined as EDPS (Engineering Digital Prototyping for Satellite) is proposed. Aiming at modeling product information in system design, multi-discipline analysis and simulation, process planning, and prototype testing, be compatible with different data and file format, providing a consistent product semantics information model, EDPS is defined and represented based on ontology to promote collaboration in product development. The composition and representation method of EDPS is proposed. The satellite design process driven by EDPS is discussed as a case study.

About the Power Transfer in Linear Time-Varying Circuits

Manuel de la Sen¹, Santiago Alonso-Quesada¹, Aitor Garrido¹, Asier Ibeas²

¹University of Basque Country, Spain

²Autonomous University of Barcelona, Spain

This manuscript studies the achievement of a maximum power transfer from source to load in electric circuits where their basic elements (resistance, inductance and capacitance) are eventually linear and time-varying but not necessarily everywhere time-differentiable. This last aspect is quite relevant related to the inductive part of the circuit whose time- derivative, where it exists, plays the equivalent role of a resistor while at potential time instants where such a time-derivative does not exist exhibits an impulsive characterization. The power transfer degradation is also formulated with explicit formulas compared to the initial values of the circuitry provided that the source remains unaltered through time.

A Methodology for Designing an Interoperable Industrial Ecosystems, using the Axiomatic Design Theory

Izunildo Cabral, Pedro Espadinha-Cruz, Antonio Grilo, Antonio

Gonçalves-Coelho, Antonio Mourao

Universidade Nova de Lisboa, Portugal

This paper presents a methodology to design interoperable lean, agile, resilient, and green industrial ecosystems based on axiomatic design. The main objective is to develop a systematic approach to support the detailed design of collaborative business platforms that are able to deliver high level of interoperability, as measured by the expanded business interoperability quotient measurement model. To achieve this objective, axiomatic design is employed to develop the "ideal" cooperation configuration by defining and aligning a set of functional requirements necessary to establish an effective and efficient cooperation among networked organizations. The applicability of the developed methodology is tested through an application scenario of implementing reverse logistics among an automaker focal firm and its upstream partners, as well as some external stakeholders.

An Approach of Generative Design System: Jewelry Design Application

Somlak Wannarumon Kiejarova¹, Prapasson Pradujphongphet¹, Erik Bohez²

¹Naresuan University, Thailand

²Asian Institute of Technology, Thailand

This paper proposes an approach of generative design system based on shape grammar for jewelry design applications. It aims to support designers in exploring shapes, and as a source of inspiration. Shape transformations in jewelry design process were studied to identify how shapes are transformed from one state to another. The transformations of curved outlines in a logical manner are explained through shape grammar and shape rules. The results of this study were used to develop a generative design system that applies transformations to primitive elements and creates new 3D new shapes based on a finite set of shape rules defined within a shape grammar. Examples of jewelry ring designs generated by the proposed approach are included in the paper.

An Algorithmic Frame of Hybrid Position Estimation for a Mobile Handset

Hyun Min Jeon¹, Suk-Yon Kang², Jae-hoon Kim³

¹Ajou University, South Korea

²Network Technology R&D Center, South Korea

³Industrial Engineering, South Korea

Find the location based by IMU(Inertia Motion Sensor Unit) sensor in smartphone. DigitalCompass and Acceleration Double Integral, Zero Crossing used, Gyro and an algorithm that combines Digitalcompass thought. Finally, Gyro, Digita Compass, Gyro + Digitalcompass App was developed in three ways, new Algorithmic Frame.

Session	FP Facilities Planning & Management
Date	12/12/2013
Time	15:30 - 17:30
Room	Patumchard
Chairs	Carman Ka Man Lee

Minimizing Port Staying Time for Container Terminal with Position Based Handling Time

Helen Ma, Felix Chan, Nick Chung, Ben Niu

The Hong Kong Polytechnic University, Hong Kong SAR

Nowadays, maritime transport operations have become even busier. Due to the limited physical facilities, some vessels will be transferred to other terminals for services. Transferring vessels may reduce the waiting time, however, this induces extra transshipment cost, bad reputation, and potential customer loss. To consider such practical issues, a bi-objective Berth Allocation Problem (BAP) model is proposed. Moreover, vessel priority is another practical concern. In literature, they are divided into two streams, i) customer importance; and ii) handling volume. They give vessel priority by considering only one single factor, but both factors are important. The objective of this paper is to propose a Genetic Algorithm (GA) to minimize port staying time and transfer rate with the consideration of vessel priority. The results show that the proposed approach is able to obtain solutions with good performance in all the factors.

Creation of FCEV Market: A New Approach to the Emerging Economy of Self-sustainability

Takuya Hasegawa¹, Hitoshi Igarashi¹, Kiminori Gemba²

¹*Nissan Motor Co. Ltd, Japan*

²*Ritsumeikan University, Japan*

Fuel cell electric vehicles (FCEVs) are currently attracting attention as a new form of zero-emission vehicles, just as the commercialization of battery electric vehicles (BEVs) is underway. In the prior 20 years, however, FCEVs failed to be properly commercialized. In this paper, a new approach to the emerging economy of FCEVs and a hydrogen refueling station (HRS) network are studied.

Optimization of Facility Location Problem in Reverse Logistics Network using Artificial Bee Colony Algorithm

Shu Zhu Zhang, Carman Ka Man Lee

The Hong Kong Polytechnic University, Hong Kong SAR

The management of used products attracts an increasing attention, which brings out the concept of Reverse Logistics. Reverse logistics is the reverse flow of surplus material back to the firm for reuse, repair, remanufacturing, recycling, and disposal of used products. In this research, we use the Artificial Bee Colony (ABC) algorithm to solve the location and allocation problems of collection centers with the goal of minimizing total logistics costs. The performance of ABC algorithm is illustrated in our numerical experiments, which prove it is efficient and valid to handle the design of reverse logistics network. Our research provides useful insights of adopting of ABC algorithm for the optimization problems with multiple constrains

Bat Algorithm for Designing Cell Formation with a Consideration of Routing Flexibility

Wipada Parika, Wipada Seesuayom, Srisatja Vitayarak, Pupong Pongcharoen

Naresuan University, Thailand

Cellular manufacturing system (CMS) is an approach that can be used to enhance both flexibility and efficiency in small-to-medium lot production environment. In cell formation, machines are grouped into cells based on their contributions to manufacturing process. Flexible routes have resulted in different machine sequences causing the changes in the movement of parts between cells. The movements in manufacturing shop floor lead to the efficiency of productivity relating to costs. Cell formation problem is classified into non-deterministic polynomial-time hard problem, of which the amount of computation required to find solutions increases exponentially with problem size. Solving this kind of problem by full numerical methods especially for the large size problem can be computationally expensive. The objectives of this paper were to describe the application of Bat Algorithm (BA) for designing cell formation aiming to minimise inter-cell part movement with a consideration of routing flexibility and investigate the appropriate setting of BA parameters that have an effect to the solution quality. A cell formation designing program was coded in modular style using a general purpose programming language called Tcl/Tk. The computational experiment was designed and conducted using ten datasets, in which the number of machines in each cell is either equal or unequal. The statistical analysis on the experimental results suggested that the population size and the number of iterations have statistical impact on the quality of the solutions obtained.

A Two-Stage Mathematical Model for Cross-Docking Distribution Planning Solved by a Two-Stage Heuristic Algorithm

S. M. Mousavi¹, Ali Siadat², Reza Tavakkoli-Moghaddam¹, Behnam Vahdani¹

¹*University of Tehran, Iran*

²*Arts et Métier Paris Tech, France*

Cross-docking is a logistics approach where products from a supplier or manufacturer can be moved directly to customers or retailers without handling or storage time. In this paper, a distribution planning problem with the cross-docking centers is taken into account. A new two-stage mathematical model is formulated to minimize total costs in the multi-echelon network for the crossdocking center location and vehicle route scheduling. Then, a new two-stage heuristic based on a simulated annealing (SA) algorithm is proposed as the solving approach. The algorithm is evaluated by several test problems in small and large sizes, and solutions are compared to traditional tabu search (TS) algorithm. The proposed heuristic effectively outperforms the TS in the reasonable time.

Prediction on the Energy Or Power Structure Under the Constraint of Saving Energy and Carbon Emissions

Tuo Chen Li, Lin Qiao

Harbin Engineering University, China

With gray prediction method, this paper concludes the primary energy consumption in future based on the trend of historical data of energy consumption. Gray dynamic analysis method is used to sort the correlation between each primary energy consumption and GDP, GDP as the reference data series and primary energy consumption as the comparison one over the years. Referred to the correlation, the national energy development plans and the carbon emissions intensity, adjustment of energy structure should be focused on reducing coal consumption and enhancing the substitution of power. Considering the sensitivity of energy consumption on the economy, this paper predicts the primary energy structure and power structure under the constraints of saving energy and carbon emissions.

Session	EB 2 E-Business & E-Commerce (2)
Date	12/12/2013
Time	09:00 - 10:30
Room	Satabud
Chairs	Yi-Hui Liang, Nila Armelia Windasari

Optimizing Concurrent Configuration and Planning: A Proposition to Reduce Computation Time

Paul Pitiot¹, Michel Aldanondo², Elise Vareilles², Thierry Coudert³, Linda Zhang⁴

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⁴Catholic University of Lille, France

This communication deals with mass customization and the association of the product configuration task with the planning of its production process while trying to optimize cost and cycle time. In some previous works, we have proposed an optimization algorithm, called CFB-EA. This communication concerns a way to improve CFB-EA for large problems. Previous experiments have highlighted that CFB-EA is able to find quickly a good approximation of the Pareto Front. This led us to propose to decompose the optimization in two tasks. First, a "rough" approximation of the Pareto Front is quickly searched and proposed to the user. Then the user indicates the area of the Pareto Front that he is interested in. The problem is filtered and the solution space reduced. A second optimization is launched on the focused area. Our goal is to compare the classical single task optimization with the two tasks proposed approach.

DYNAMOD: A Modelling Framework for Digital Businesses based on Agent Based Modeling

Aneesh Zutshi, Antonio Grilo, Ricardo Jardim-Goncalves

Universidade Nova de Lisboa, Portugal

This paper introduces a Dynamic Agent Based Modelling Framework (DYNAMOD) that is designed for developing Digital Business Simulations. The model is based on literature review of three complementary research areas: Business Models, Business Applications of Agent Based Modeling and Digital Business Characteristics. This Framework is customisable and computationally implements key digital business characteristics including network effects, online and offline word of mouth, pricing strategies, amongst other features of the Digital Business Environment. DYNAMOD can be a generic framework for developing a variety of forecasting and simulation models that can provide a new computational approach to Digital Business Modeling and Analysis.

Performance Management for Inter-organization Information Systems performance: Using the Balanced Scorecard and the Fuzzy Analytic Hierarchy Process

Yi-Hui Liang

I-Shou University, Taiwan

Under the dramatic change of business environment, organizations must break up the boundary of organization, share and transfer information with strategic alliance partners or customers more closely to promote collaboration each other in order to improve enterprises' competitiveness. Inter-Organizational Information Systems (IOIS) can traverse the formal boundaries of an organization and are utilized by organizations to connect partnership and customers to promote connection and information integration and support transactions-based information and communication technology. Therefore, enterprises increasingly place more importance on IOIS. The purpose of this study is to propose a model for assessing IOIS performance. This study develops the framework based Balanced Scorecard (BSC) and uses the fuzzy analytic hierarchy process approach to consider the relative importance of diverse performance indicators in assessing IOIS performance for Taiwan's information and electronic industries. The results of this study provide references for managers and future researches when assessing the performance of IOIS.

Exploring E-readiness on E-commerce Adoption of SMEs: Case Study South-East Asia

James K. C. Chen, Nila Armelia Windasari, Pai Rose

Asia University, Taiwan

This study explores information technology (IT) readiness on E-commerce adoption of Small and Medium-sized Enterprises (SMEs) in South-East Asia. Some studies point out that the SME take more advantages of Ecommerce than large companies. However, due to limited resource for SME, E-commerce adoption should be treated in different business strategy. SMEs need to consider some factors and measure E-readiness before adopting Ecommerce into their business. This paper utilizes an AHP method to evaluate IT readiness priority which critical to support the adoption of E-commerce. Using extended Technology-Organization-Environment (TOE) framework and Asia-Pacific Economic Cooperation (APEC) E-readiness Assessment, this study aims to explore the consideration on E-commerce adoption and what should be prioritized by 17 CEOs of SMEs in South-East Asia.

The Construction of Service Innovation of Green Bed and Breakfast (B&B)

Tain-Fung Wu, Ming-Yu Yang, Shien-Liang Chen

Asia University, Taiwan

The concept of Bed and Breakfast (B&B) tourism has become much popular nowadays which results in the uneven quality on the drastic competition within the industry. The innovation of B&B service has brought out several significant qualities other than technologies such as idea of hospitality, customer interface and administrating system. Environmental friendly is a firm base of the B&B concept which combines with local cultures and customs to successfully achieve a perpetual environmental prosperity in Green tourism. In this study, three B&B owners with good performance in service innovation were chosen as the cases, and with qualitative case study, the four-structure relationship of green service were deeply analyzed for all three cases. The result showed the cases with the innovative interface and service concept alternately proceeded to develop a new market and presented an interweaving structure of innovation.

Sourcing under Incomplete Information about Suppliers

Jishnu Hazra, B Mahadevan

Indian Institute of Management Bangalore, India

Internet based marketplaces have enabled industrial buyers to locate suppliers from geographically diverse locations. This has resulted in increased variations in certain supplier parameters such as capacity and cost among the participating suppliers. In this paper we consider two supplier parameters that can affect the price the buyer pays and the number of suppliers that the buyer will select for award of contract. These attributes are capacity and cost. We show how the buyer will determine the optimum number of suppliers using a reverse auction mechanism when she does not have perfect knowledge of the suppliers' parameters.

Session	RM 2 Reliability & Maintenance Engineering (2)
Date	12/12/2013
Time	11:00 - 12:30
Room	Satabud
Chairs	Behzad Ghodrati, David Valis

Dynamic k-out-of-n System with Component Partnership Design with Two Dependent Competing Failure Processes

Nida Chatwattanasiri¹, David Coit¹, Naruemon Wattanapongsakorn², Qianmei Feng³

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The adaptive k-out-of-n system composed of multiple types of components that each component can form a partnership with the same type of components or with even better performances to achieve reliability of a working system is called dynamic k-out-of-n with component partnership. A dynamic k-out-of-n reliability model with component partnership is proposed where all components experience dependent failure processes due to simultaneous exposure to degradation and shock loads. The failure processes are dependent due to the arrival of each shock having impact on both failure processes for all components. The dynamic k-out-of-n system is suitable for certain design problems when the minimum number of required components, k, changes dynamically in response to failures. The dynamic k-out-of-n system component partnership considering two dependent competing failure processes is defined where k can change over time to maintain high reliability of the system in response to degradation and shock failures.

Remaining Useful Life Prediction for a Hidden Wiener Process with an Adaptive Drift

Zeyi Huang, Zhengguo Xu

Zhejiang University, China

Prediction of remaining useful life (RUL) based on conventional Wiener process depends merely on the current degradation level, which may issue in the inaccurate prediction. Moreover, measurement noises are inevitable in practical systems. Thus, a hidden Wiener process with an adaptive drift is developed to take measurement noises and the whole historical degradation data into account simultaneously. The degradation state, along with degradation drift, is estimated by Kalman filter. Meanwhile, the expectation maximization algorithm and the Rauch-Tung-Striebel smoother are applied to estimate the unknown parameters. Furthermore, we derive the analytical form of the distribution of RUL incorporating the uncertainty of both degradation state and degradation drift. The distribution can be timely updated based on the new measurements. To validate the proposed approach, a simulation and a case study are presented and the results show that the parameters and the RUL can be estimated accurately.

Reliability Analysis of Condition Monitoring Data on Aging Plants: A Case Study From Topside Static Mechanical Systems

R.M. Chandima Ratnayake, Mayang Kusumawardhani

University of Stavanger, Norway

The quality of static mechanical systems' integrity control process on aging oil & gas production and process plants (P&PPs) depends on the accuracy of the condition monitoring data. This is especially the case since accurate interpretation of the data could significantly aid the right decision-making at the right time in the right location. However, anomalies have been observed in the historical inservice inspection data records pertaining to most aging plants under study. Such anomalies result in sub-optimal inspection decisions and jeopardize the quality of an in-service inspection program. The uncertainties of condition monitoring data have been discussed in the literature and industrial community over the years. A number of approaches have been proposed to address the various challenges pertaining to uncertainties present in the in-service inspection data. This manuscript suggests an empirical approach for quantifying the reliability of condition monitoring data to estimate the level of anomalies present in the in-service inspection data and to investigate the source of these anomalies. A case study has been carried out using three different P&PPs functioning on the Norwegian Continental Shelf. The flowline system of each plant has been selected as that has been given highest risk priority.

Human Reliability and Workload in Product Design with different Frequencies of Interruption

Raymond Djaloëis, Soenke Duckwitz, Malte Hinsch, Joerg Feldhusen,

Christopher M. Schlick

RWTH Aachen University, Germany

Product design requirements are often volatile and require human input. To create a deeper understanding of human reliability in product design, a phase-dependent multi aspect taxonomy for the description and analysis of human reliability in product design has been developed. Based on this theory, different research hypotheses regarding the effects of the variable frequency of interruption" on the quota of fulfilled product requirements and on workload, frustration and effort were formulated and empirically analyzed by conducting a laboratory experiment with 79 students from a master program in mechanical engineering of RWTH Aachen University. The results are presented in this paper.

Maintenance-based Warranty for Offshore Wind Turbines

Yiliu Liu, Lijuan Dai

Norwegian University of Science and Technology, Norway

Most products are sold with warranties nowadays, including offshore wind turbines. However, these turbines are complex engineering systems located far away from manufacturing facilities, and as a result their warranties are different from those for consumer products. In this paper, we consider maintenance strategies as the major elements in the warranties for offshore wind turbines, which also include timing requirements, charges and coverage. Warranty cost of turbines is analyzed as the combination of maintenance cost and loss of power production. Uncertainties in the analysis are also discussed.

Prediction of Further Operation Based on Vehicle Tribo Data

David Valis¹, Libor Zak², Jiri Chaloupka³

¹University of Defence, Czech Republic

²University of Technology, Czech Republic

³Military Technical Research Institute, Czech Republic

The paper deals with application of selected analytical methods for analysing field data from heavy offroad military vehicles. The information from the engine oil are interpreted in form of polluting particles like particles from wear process (e.g. Fe, Pb, Cu, etc.) and particles from oil deterioration itself (like Mn, Si, Zn, etc.). These pieces of information have good technical and analytical potential which has not been explored well yet. There is available reasonable set of vehicles and their oil data from in-fieldoperation. Based on the data we assume it will be possible to determine some changes in the system. This may help to change e.g. the system maintenance policy, may estimate system operation and help in mission planning.

Session	RM 3 Reliability & Maintenance Engineering (3)
Date	12/12/2013
Time	13:30 - 15:00
Room	Satabud
Chairs	Om Prakash Yadav, Yiliu Liu

Coast Down Time Analysis for Condition Monitoring: An Experimental Investigation to Study the Effects of Bearing Lubrication and Shaft Misalignment in Rotating Machinery

K P Ramachandran, Rameshkumar Ramaswamy, Lubulubah Hatif Al Hatmi
Caledonian College of Engineering, Oman

The inherent behavior of any rotating system after the power cut-off is termed as the Coast down Phenomena (CDP). Coast Down Time (CDT), which is the exact time elapsed during deceleration period, can be effectively used to monitor the tribological behavior and mechanical degradation of rotating machinery. This paper presents results of an experimental investigation on a Centrifugal Blower test setup supported with full journal bearing to study effects of lubricants and influence of shaft misalignment on CDT under different operating conditions. Extensive experimental work has been carried out with different oils (different grades of both fresh and used oils) under various shaft misalignment conditions at different cutoff speeds to study the tribological behaviour of lubricants and to study the effect of oil degradation on CDT. Further, an attempt is made to understand effectiveness of lubrication using CDT as performance parameter in comparison with steady state vibration which can be used as tool for selection and optimization of the lubricants for a given application. The result shows that higher order of shaft misalignment condition has considerable effect on CDT at lower cut-off speed.

Estimation of Residual Life based on Vehicle Tribo Data

David Valis¹, Ondrej Pokora²

¹University of Defence, Czech Republic

²Masaryk University, Czech Republic

The aim of the article is to estimate a system technical life. When estimating a residual technical life statistically, a big amount of tribo-diagnostic data is used. This data serves as the initial source of information. It includes the information about particles contained in oil which testify to oil condition as well as system condition. We focus on the particles which we consider to be interesting. This kind of information has good technical and analytical potential which has not been explored well yet. By modelling the occurrence of particles in oil we expect to find out when a more adequate moment for performing preventive maintenance might come. The way of modelling is based on the specific characteristics of diffusion processes, namely the Wiener process. Following the modelling results we could in fact set the principles of "CBM - Condition Based Maintenance". However, the possibilities are much wider, since we can also plan operation and mission. All these steps result in inevitable cost saving.

An Inspection-maintenance Strategy for Heterogeneous Systems with Measurable Degradation

Zhi-Sheng Ye¹, Mimi Zhang², Xun Xiao²

¹The Hong Kong Polytechnic University, Hong Kong SAR

²City University of Hong Kong, Hong Kong SAR

Products are often designed to be very reliable such that even a defective unit can function for a long time. Instead of degradation-based burn-in for these kinds of products, this study advocates an inspection-maintenance strategy to make use of these weak units. Under this policy, an inspection is conducted in the midway of the system operation with the purpose of identifying and replacing a defective unit, while an age-based preventive replacement is carried out at a later stage to prevent a wear-out failure. By capitalizing on the gamma process, the mean cost rate function of this policy is derived. Optimal inspection and preventive maintenance times are discussed. We compare the average cost of this policy with the joint burn-in and maintenance policy to demonstrate its advantages.

Condition Based Optimal Maintenance Strategy for Multi-Component System

Manish Rawat, Bhupesh Kumar Lad

Indian Institute of Technology Indore, India

This paper proposes a condition based group maintenance policy for multi-component system. Condition of the components is defined in terms of Remaining Useful Life (RUL). Predicted RULs are always associated with some uncertainty. The RULs and associated uncertainty then affect the maintenance decision making. This work aims at obtaining optimal maintenance grouping of components at current planned shutdown and optimal time for next planned shutdown. A simulation based optimization approach is used to solve the problem. The problem is of high importance to industries which operate continuously, like power plants, processing industries, etc.

Deriving an Empirical Model for Machinery Prioritization: Mechanical Systems Maintenance

R.M. Chandima Ratnayake¹, Dorota Stadnicka², Katarzyna Antosz²

¹University of Stavanger, Norway

²Rzeszow University of Technology, Poland

The maintenance of mechanical systems plays a significant role in production and manufacturing settings. In this context, prioritization of machinery is vital for minimizing the economic burden due to higher maintenance cost, loss of production, potential damage to health, safety and environment. Different production and/or manufacturing firms use different approaches to mitigate the aforementioned. These approaches are tailor-made to fit a selected production or manufacturing operation and the firm's requirements, creating a difficulty in generalizing their utilization in a generic application. Hence, it is vital to analyze the existing models that have been used for the machinery prioritization and derive a generic model, enabling it to be utilized in a generic application. This manuscript illustrates a study carried out in three firms which utilize machinery for their production and/or manufacturing activities. The empirical models that have been employed for machinery prioritization by the aforementioned firms were analyzed and a generic empirical model has been derived. The empirical model has been validated by a randomly selected firm and one item of its machinery.

The Bivariate Generalized Variance |S| Control Chart with Runs Rules

Chee Jiun Chong, Ming Ha Lee

Swinburne University of Technology Sarawak Campus, Malaysia

This work studies the effect of incorporating the 2-of-k, 3-of-k, and k-of-k runs rules into the one-sided bivariate generalized variance |S| control chart, in terms of the average run length (ARL). The Markov chain approach is used to obtain the ARL profiles for the proposed chart. The general transition probability matrices for the 2-of-k, 3-of-k, and k-of-k runs rules are constructed. The charts have better ARL performance than the standard |S| chart. The results also indicate that the out-of-control ARL of the chart with 2-of-k runs rule decreases with increasing values of k up to a point beyond which the ARL increases. This is also the case for the 3-of-k runs rule. Meanwhile, the out-of-control ARL of chart with k-of-k runs rule increases as the value of k increases. The chart with the 2-of-k runs rule gives better ARL performance than the chart with 3-of-k and k-of-k runs rules.

Session	RM 4 Reliability & Maintenance Engineering (4)
Date	12/12/2013
Time	15:30 - 17:30
Room	Satabud
Chairs	Ramachandran K P, R.M. Chandima Ratnayake

In-Service Inspection of Offshore Concrete Structures: Application of an Expert System

Samindi Samarakoon, R.M. Chandima Ratnayake
University of Stavanger, Norway

In-service inspection plays a significant role in maintaining the structural integrity of offshore structures. The in-service inspection covers in-situ inspections, evaluation of inspection results, condition assessment of the structure and planning for future inspections. The planning of in-service inspection is a complex process due to the presence of uncertainties; in particular the uncertainties present in the inspection results. In addition, the vagueness and the importance of expert knowledge necessitate having a methodology to integrate in a coherent manner. This manuscript suggests a fuzzy expert system to address the aforementioned. This enables optimizing the number of inspection points to be focused on, whilst identifying the potential risk areas needing priority in future inspections with minimal effort and higher efficiency. This manuscript also discusses the use of available inspection methods of offshore concrete structures subject to deterioration and the use of inspection evaluation results to develop an expert system for future inspections.

Double Intelligence Contests vs. Impact Contest in Defending Genuine Object with Imperfect False Targets

Mengya Wan¹, Xiuyi Chen², Jun Yang¹, Rui Peng², Yu Zhao¹
¹*Beihang University, China*
²*University of Science and Technology, China*

Deploying false targets is an effective measure to increase the survivability of genuine object when it encounters intentional attacks. Existing researches have mainly assumed that the false target is perfect or can be detected with a constant detection probability. In this paper, it is assumed that both genuine object and false target are possible to be detected. The detection probability of the genuine object/false target depends on the attacker's intelligence effort and the defender's disinformation effort. A game between the defender and the attacker with constrained resource is modeled, which can be divided into the intelligence contest on genuine object, intelligence contest on false targets and the impact contest. The system survivability is modeled as a function of the defender and the attacker's strategies. As a beginning, numerical analysis is implemented to study the optimal attack strategy as functions of the defense strategy.

Plant Systems and Equipment Maintenance: Use of Fuzzy Logic for Criticality Assessment in NORSOK Standard Z-008

R.M. Chandima Ratnayake
University of Stavanger, Norway

The NORSOK standard Z-008 suggests a criticality matrix for use in consequence classification, maintenance planning, inspection planning and for prioritizing work orders. When the criticality assessments are carried out using a criticality matrix, suboptimal classification tends to occur as there are no means to incorporate actual circumstances at the boundary of the input ranges or at the levels of linguistic data and criticality categories. This manuscript suggests a fuzzy inference system (FIS) to overcome the aforementioned. Membership functions and the rule base development have been carried out in alignment with the Z-008 standard recommended guidelines. A rule view and a calculation result have been demonstrated to illustrate the methodology.

Time-variant Reliability Analysis of Mechatronic Product Based on PSO and Up-crossing Rate Approach

Bo Liu, Jianguo Zhang, Pidong Wang, Zhiyi Ma
Beihang University, China

Time-variant is the typical characteristic of components and systems and the classical approach for time variant reliability analysis relies on the computation of upcrossing rates. In order to get the up-crossing rate, the common up-crossing approach uses a FORM method to compute the instantaneous reliability index at each time. FORM method likely lead to decrease of the result's accuracy when the limit state function is strong nonlinear. In this paper, a new approach combined PSO with up-crossing approach is proposed to solve this problem and the instantaneous reliability index is computed by PSO. Then a numerical case is carried out to compare this method with up-crossing approach and Monte-Carlo simulation, and the results show that the new approach appears more accurate.

World Class Maintenance (WCM): Measurable Indicators Creating Opportunities for the Norwegian Oil and Gas Industry

Syeda Fahmida Imam¹, Jawad Raza¹, R.M. Chandima Ratnayake²
¹*Apply Sørcø, Norway*
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World Class Maintenance (WCM) concept is considered as an integrated approach to perform asset maintenance comprehensible for all participants in an industrial organization. WCM creates opportunities to make the work processes more efficient and effective in a way that these are universally applicable to increase the safety, economy and overall efficiency of the assets. A well-defined WCM work process can offer a unique business opportunity with minimum costing to the assets' owner whilst increasing significant return on investments. This manuscript attempts to explore the adaptability of WCM concept in the Norwegian Oil and Gas (O&G) industry. It further identifies measurable WCM indicators and highlights the current trends of WCM as observed in the Norwegian O&G industry. The identified indicators in this context can be used for mapping current performance of any operating assets by comparing it with the WCM standards.

Design an Effective Reliability Demonstration Test Plan using Six Sigma Approach

Mohamad Razif Mohd Idris, Azmir Aladin
MIMOS Berhad, Malaysia

Reliability Demonstration Test (RDT) is a stress testing to determine whether the product will meet a specified reliability goal and time. Often being discussed is the method in performing the RDT, but the detailed steps in developing RDT is seldom being shared, especially on new product development with no correlation to field data. RDT is a hypothesis testing, failure in using the effective RDT plan will cause disputed confidence in the integrity of the testing result. One of the ways to ensure the effectiveness of the RDT plan is by implementing the Six Sigma strategy. In this paper, the planning of developing RDT by using a structured Design for Six Sigma method, DMADV – Define, Measure, Analyze, Design and Verify is discussed. The DMADV steps will guide and outline the process from early stage until the end stage of developing the RDT plan. The plan will consider every process that is involved in the product design life cycle, including market or customer needs, reliability requirements, cumulative effects of use environment, life analysis distribution and tests equipment capabilities. The analysis tools used are translated from Critical-To- Quality (CTQ) to Critical-To-Reliability (CTR) requirements.

Session	TK 3 Technology & Knowledge Management (3)
Date	12/12/2013
Time	09:00 - 10:30
Room	Boontarik
Chairs	Suthep Butdee, Matti Karvonen

Impact of Organizational Characteristics on the Relationship of Management Practice Factors, Efficient Technology Transfer and Firm's Business Performance

Nguyen Thi Duc Nguyen, Atsushi Aoyama
Ritsumeikan University, Japan

Although people's attention is drawn toward efficiently achieving cross-cultural technology transfer and business performance through the innovation management practices, the investigation upon organizational characteristics could produce the insight. This study aims to explore the appropriate approaches for efficient performance upon organizational characteristics ? firm's size, firm's age, firm's type of ownership, and manager's cross-cultural technology transfer experience ? at 223 Japanese manufacturing subsidiaries in Vietnam. The results through SEM-multigroup analysis indicate that: (1) on the relationship between management practice factors and efficient technology transfer, the significant differences lie at firm's size for training; firm's years of operation and firm's type of ownership for management commitment; manager's experience in cross-cultural technology transfer for sharing and understanding; and (2) on the impacting correlations of efficient technology transfer on firm's business performance in term of productivity and innovative capacity, the significant difference produces at firm's operating years.

Technical and Non-Technical Innovation Models in China's SMEs: A Case Study

Jin Chen, Juxiang Zhou, Feng Xu, Yue Yin
Zhejiang University, China

SMEs are the important part of China's economy and innovation entities. Based on theoretical analysis, this paper puts forward an applicable innovation models for SMEs. An in-depth case study of Beijing Tianyu Communication Equipment Co. Ltd is carried out to show how a firm's various kinds of technical and non-technical innovations influenced its business performance. This paper concludes that ingenious combination of technical and nontechnical innovation would promote enterprises' overall performance, and would be the driving force of their consistent development.

The Impact of Scientific Knowledge Resources on Innovation Performance: A Case Study

Juxiang Zhou¹, Jin Chen², Xiaoting Zhao¹, Xiangzhen Yu³, Yue Yin¹

¹*Zhejiang University, China*

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Chinese enterprises are inherently weak in scientific research and little input in this area, resulting an always weak position to participate in international competition. Enterprises whose target is fame and fortune are most concerned whether the scientific research promotes innovation performance. In this study, on the basis of in depth study of knowledge management and science-based innovation theory, we design the scientific knowledge measurement indicators, which consists with science-based innovation dimension and stocks of scientific knowledge dimension. Based on interviews and secondhand information analysis, we convince our science-based innovation framework by a case study and find that Chinese enterprises can carry out science-based innovation by borrowing brain and buying technology, thereby greatly enhancing the innovation performance.

Developing Proprietary or Open Source Technology: Learning from Five Case Studies

R R K Sharma, Ajay Jha, Sandeep Rajput
Indian Institute of Technology Kanpur, India

Companies in high technology area either have to lead and set the industry standard, or quickly follow the prevalent, or risk becoming obsolete. Learnings from this paper are following: First, the Innovators tend to develop proprietary technology to take advantage of first to market and the late entrants try to make up by developing open source technology. However the proprietary strategy is not always successful in launching improved substitute owing to the network effect and switching cost and the market may favor an inferior product. Second, the elite products are generally produced under proprietary technology, whereas broad base products are aimed by open Source. Third, with time the proprietary systems are found expensive to maintain, and are made open to sustain. Fourth, proprietary technology aims for vertically integrated supply chain leading to full ownership of upstream and downstream supply components. Finally the long term strategy calls for open source for greater market size.

Overtime Reduction, Work-Life Balance, and Psychological Well-Being for Research and Development Engineers in Japan

Tetsushi Fujimoto, Sayaka Shinohara, Hideki Shimizu-Tanaka, Yoshifumi Nakata
Doshisha University, Japan

Due to the recent intensification of work hour regulation by Japanese employers, a large number of engineers in research and development are increasingly unable to put in satisfactory amount of time in work, and the incidences of experiencing non-accomplishment in work are growing. This study investigates whether and how the overtime reduction affects engineers' sense of fulfillment in work and personal life, and examines how they influence engineers' depression and perceived health. Results show that overtime reduction has both positive and negative sides, and while on one hand it enhances the time adequacy for engineers' private life, on the other hand it significantly reduces their sense of fulfillment in work. Furthermore, unbalance such as "non-achievement in work" and "fulfillment in private life" is likely to deteriorate their psychological well-being. Findings suggest that in order to realize engineers' work-life balance it is not sufficient to just enhance the time in private life, but it is also necessary to ensure simultaneously a sufficient time in work.

Integration of Design for X Approaches in the Concept of Lean Design to Enable a Holistic Product Design

Uwe Dombrowski, Stefan Schmidt
Technische Universität Braunschweig, Germany

The essential conditions for all product lifecycle processes are highly determined by the product design. The concept of Lean Design focuses on maximizing customer value and minimizing waste throughout all stages of product lifecycle by an optimized product design. However, multiple, partly competing aspects have to be taken into consideration by a designer generating a holistic product design. Qualitative design guidelines help designers to choose the right product design decisions. Though, Lean Design does not provide such guidelines on an adequate level of detail. Therefore, this paper argues for an integration of Design for X approaches in the concept of Lean Design. An approach is presented that links concrete product design to customer value and waste in lifecycle processes by help of qualitative design guidelines recommended in Design for X approaches. As a basis for this connection the Characteristic-Property- Modell according to Weber is used.

Session	SR 2 Safety, Security & Risk Management (2)
Date	12/12/2013
Time	11:00 - 12:30
Room	Boontarik
Chairs	Zhi-sheng Ye, Xiuju Fu

Clarifying the Value Elements of Business Models for Disturbance Management in Supply Chains

Lea Hannola, Nina Tervonen, Ville Ojanen, Tuomo Kässi
Lappeenranta University of Technology, Finland

The interest towards solutions related to the management and analysis of disturbances in supply chains has increased, which has led to a pressure among technology and service providers to develop comprehensive business models to response customer needs. The aim of the study is to clarify the value elements of a business model for disturbance management and analysis in supply chains. Regarding to the elements of a business model, the paper concentrates on the analysis of customer segments, needs and demands related to the potential benefits for the customers. The research is done by the perspective of a solution provider developing a service entity to logistic intensive companies. The results of the study show that there are clear needs and benefits for the development of solutions for disturbance management and analysis. In addition, a SaaS based value proposition is stated for the new solution of disturbance management and analysis in supply chains. The value proposition is based on the determination of customer needs, solution approach, benefits and prevailing competition of the new service entity.

Customer Needs for Analyzing and Managing Disturbances in Transport Logistics

Nina Tervonen, Lea Hannola, Ville Ojanen
Lappeenranta University of Technology, Finland

Logistic-intensive companies face a number of transport disturbances every year, which can have significant effects on their operations and cause unnecessary costs. Although these problems are familiar to many companies, the development of practices for managing and analyzing disturbances is still at an early stage. In the future, the growing importance of non-interference and the hard competition drive companies to compete particularly on reputation and quality. The tools for disturbance management and analysis can help companies to monitor and control the negative effects caused by disturbances. The aim of this study is to identify the needs of logistic-intensive companies for developing ways to analyze and manage disturbances in order to enhance the proactive risk management in transport logistics. The data was collected by conducting semi-structured interviews in 14 logistic-intensive companies. As a result of the study, the customer needs are identified and analyzed for developing best practices for disturbance management in transport logistics.

Risk Management of Construction Projects Based on Sandpile Model: a Frame of Risk Conduction

Bingbing Xu, Y. Q. Chen, C. M. Wang
Tianjin University, China

With the rapid development of Chinese economy and society, more and more construction projects will be carried out, so how to manage risks becomes a matter of concern in construction projects. The starting point for the effective implementation of risk management is to identify sources of risk and risk conduction pathway. This paper first classifies risks of construction projects into categories from stakeholders' perspective, such as: endogenous risks and exogenous risks. Based on risk conduction theory and sandpile model, a framework of construction key risk conduction is established in this paper. Its application to risk management was also briefly illustrated. Finally, we propose a process to deal with varied risks. Studying the risks conduction will be helpful to understanding and managing risks in construction projects.

Implications of Radioactive Contamination near Production Sites for Product Quality-related Risk Perceptions and Customer Loyalty

Bjoern Frank, Dinush Wimalachandra
Tokyo Institute of Technology, Japan

To help understand consumer reactions to risks of product contamination caused by national disasters, this article studies radioactive contamination caused by the 2011 nuclear accident in Japan. Purchase situations confront consumers with products manufactured at production sites near contaminated regions of Japan. Consumers may either reduce their purchases of such products to protect their health, or increase their purchases to support suffering Japanese regions. Based on consumer data from Japan, Ecuador, Bolivia, and Sri Lanka, this article illuminates the influence of knowledge, information sources, past experience, and personal characteristics on purchase decisions. Consumers indeed reduce or increase their purchases as a response to the risk of radioactive contamination. While health risk estimates, past experience with natural disasters, and the country of residence most strongly influence this purchase decision, media reports and past opposition to radioactivity most strongly influence health risk estimates. Estimates of radioactivity levels are not influential.

Research on Safety Management of Freeway Traffic

Bing Li
Hebei University of Technology, China

With the rapid development of the freeway, preventive work of freeway traffic faces larger and larger test. This paper adopts 1561 cases of traffic accidents in the Jiliao-freeway in past 5 years to find out the factors that affect safety. The study found out some factors which cause freeway traffic accidents, they are time, weather, the number of patrol vehicles and monitoring, age and attribution of the accident driver. The paper studies the management problems with a two-step clustering method and puts forward on the countermeasures and suggestions, especially the problem of freeway traffic police job burnout. This problem which involves in safety management freeway traffic will reach a new level and lay the foundation for the future research work to protect the freeway safe and smooth effect.

Session	IS Intelligent Systems
Date	12/12/2013
Time	13:30 - 15:00
Room	Boontarik
Chairs	Yuri Popkov, Poobalan Govender

Difference Priority Algorithm in Semiconductor Scheduling Problems

Kun-Ming Yu, Ming-Gong Lee, Chang-Hsing Lee, Yon-Yaw Chen
Chung Hua University, Taiwan

The semiconductor industry is one kind of capital intense industry. To establish a new professional testing company, the budget for machines is almost 90% of the whole company's expense, and it can be amortized within 5 years only. Thus, how to improve the efficiency and effectiveness of the testing procedure is one of the most important issues for a semiconductor testing company. In this paper, the algorithm MDP-GA is proposed which is a hybrid algorithm of the difference-priority and genetic algorithms (GA). It emphasizes on accelerating the converging process and improves quality of solution obtained. The converging process can be completed within a short time, and the solution will not converge to a local optimized solution. In order to investigate the performance of the MDP-GA, some experiments under the best condition and three different cases are designed for simulation. The numerical results are compared with results from GATS (the hybrid algorithms of GA with Tabu search). From the outputs of the experiments by the MDP-GA and the GATS, the average completion time of the MDP-GA outperforms the GATS. On the best condition, the production rate can raise up to 270%-1000% by the MDP-GA.

Fault Classification on High Voltage Power Lines Using Principal Component Analysis and Feed-Forward Artificial Neural Networks

Poobalan Govender, Neelendren Pillay, Kevin Emanuel Moorgas
Durban University of Technology, South Africa

Overhead high voltage power transmission lines are affected by various external factors that result in faults and power outages. Most faults on overhead high voltage power transmission lines are due to factors such as lightning, fire, birds, pollution and other faults. The managing utility has to take the appropriate mitigating action in order to reduce the recurrence of line faults. This is possible if the exact cause of the fault is known. This paper examines the impact of lightning, fire and birds on the power line and proposes a simple artificial neural network based system to identify the exact cause of a transmission line failure.

Application of Estimation of Distribution Algorithms for Solving Order Acceptance with Weighted Tardiness Problems

Watcharee Wattanapornprom¹, Tiek Li¹, Warin Wattanapornprom², Prabhas Chongstitvatana²

¹*University of Science and Technology Beijing, China*

²*Chulalongkorn University, Thailand*

Over the past decade the strategic importance of order acceptance has been widely recognized in practice. This research studies the adaptation of estimation of distribution algorithm to solve the order acceptance decisions when capacity is limited. The results show that the four new estimation of distribution algorithms are all better than the genetic algorithm with local search.

A Risk Assessment Model Using Artificial Neural Networks Case Study: National Iranian Oil Products Distribution Company (NIOPDC)

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¹*Islamic Azad University, Iran*

²*National Iranian Oil Products Distribution Company, Iran*

The world today is full of risks and we had to deal with besides assessing them. We are forced to identify and estimate their consequences. Organizations are making large investments in information technology (IT) projects. Effective management of risks in projects is therefore extremely important. The objective of this research is design of Artificial Neural Network (ANN) model for ranking risk of project in national Iranian oil products distribution company (NIOPDC). Used data is belonged to NIOPDC during the years 2005-2010. For design of ANN the neuro solution software is used. To obtain a network capable to demonstrate the connections between the inputs, an MLP with error back propagation is used. Considering the numbers of the inputs and the space of prioritization is scope of this research for solving the problem. We have used one hidden layer with maximum 16 neuron, 42 neuron in the input layer and 5 neuron in the output layer.

Dynamic Parallel Machine Scheduling Using the Learning Agent

Biao Yuan, Lei Wang, Zhibin Jiang
Shanghai Jiao Tong University, China

Static and dynamic machine scheduling problems have been widely addressed in literature. Compared with static scheduling, dynamic scheduling is more difficult since the detailed information about jobs and machines (like the arrival time of jobs) is not available at the initial time. Hence the lack of information makes dynamic scheduling problems harder than static ones. In this paper, the learning agent based scheduling system is developed to dynamically schedule machines in parallel. The scheduling system contains the learning agent and the system environment. The agent is trained by the Q-Learning algorithm, and the best rule is selected according to the current state of the system, while the system environment executes the rule selected by the agent. In the simulation experiment, the proposed agent uses the rules of SPT, EDD and FCFS as actions, and is tested with two objectives: minimizing the maximum lateness and minimizing percentage of tardy jobs. The results demonstrate that the learning agent is suitable for complex dynamic parallel machine scheduling.

In-Service Inspection of Static Mechanical Equipment: Use of a Fuzzy Inference System for Maintaining the Quality of an Inspection Program

A.M.N.D.B. Seneviratne, R.M. Chandima Ratnayake
University of Stavanger, Norway

It is necessary to inspect the piping components of offshore production and process facilities (OP&PFs) to investigate potential failures. This is especially vital for aging OP&PFs in order to make the necessary engineering judgments regarding maintenance and modification (M&M) activities. In an OP&PF, piping plays a vital role within the static mechanical equipment. To analyze the degradation trends in the piping, the wall thickness measurements have been periodically monitored and recorded at the locations with a high risk of failure. Inspection planners make recommendations on the thickness measurement locations (TMLs) to be monitored based on: the currently available recorded data, risk-based inspection (RBI) analysis results, plant inspection strategy guidance and other regulatory requirements. The quality of the recommendations made by an inspection planner to prioritize TMLs depends on their experience and competence. Hence, it is vital to develop expert systems to support and minimize sub-optimal decisions when an inspection planner is inexperienced. This manuscript illustrates the use of a fuzzy inference system (FIS) for making optimal in-service inspection recommendations based on the current status and trends of TMLs in the static mechanical equipment of an OP&PF. The proposed FIS enables the expertise of experienced inspection planners to be incorporated via developed membership functions (MFs) and a rule base, which will support and maintain the quality of an inspection program at the intended level.

Session	MS Manufacturing Systems
Date	12/12/2013
Time	15:30 - 17:30
Room	Boontarik
Chairs	Lionel Amodeo, Prafulla Kulkarni

Design of Integrated Scheduling and Automated Controlling for Surface Treatment Process using Supervisory Control and Data Acquisition (SCADA)

Dida Damayanti, Haris Rachmat, Denny Sukma Atmaja
Institut Teknologi Telkom, Indonesia

This paper aims to design a model of integrated scheduling and automated controlling for a surface treatment process in an aircraft manufacturing company, where in this case aircraft parts are dyed into chemical liquid to be corrosion-proof. In the existing plant, parts dyeing processes (moving the crane and monitoring the tanks temperature) are done manually. Integrated scheduling and automation control system is proposed to improve planning, control and safety issues in the dyeing process. The scheduling system is developed using fuzzy logic algorithm to minimize makespan and the automation system is designed based on Supervisory Control and Data Acquisition (SCADA). A case study has shown that the simulation of proposed model can result in reducing makespan of about 51,3 % and the schedule can be implemented automatically in the surface treatment prototype.

Common Production Process Modeling for MES Based on Multi-Agent

Shikai Luo, Guiming Luo, Xibin Zhao
Tsinghua University, China

In discrete manufacturing enterprises, the production processes are complex and varied. In order to construct a manufacturing execution system (MES), up to 70% of the work must be customized. This cost represents a tremendous waste when MES are developed, especially in terms of development cycles. In this paper, a flexible method for designing the common production process of an MES is proposed using multi-agents. The enterprise framework is described by an automaton. The whole MES is modeled by a multi-agents system (MAS), which contains databases, order agents, environment agents, and control monitors. With the efforts of these multi-agents, the MES is able to become more intelligent and more efficient, and it can work without intervention from the enterprise resource planning (ERP) system.

Genetic Algorithm Approach for Solving Intercellular Layout Problems in Cellular Manufacturing Systems

Prafulla Kulkarni¹, Kripa Shanker²
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²*Indian Institute of Technology Kanpur, India*

In this paper, a comprehensive genetic algorithm (GA) based solution methodology is proposed for solving layout problems in cellular manufacturing systems (CMS). The issue of intercellular layout is dealt with. The layout of facilities to locations called as facility location problems has been most researched. The optimal assignment of facilities to locations is a combinatorial optimization problem and has been proved NP-hard. The proposed solution methodology is compared to the facility locations algorithms as well as with the other existing algorithms. The novelty of the proposed genetic algorithm lies in the way the initial solution is constructed, and in the way the initial and final chromosomes for GA are obtained. In order to validate the performance of the algorithm, a well known CMS problems that deals with location, is taken for testing which shows that the proposed methodology provides promising results.

Lean Implementation in Small and Medium Enterprises – A Singapore Context

Laura Xiao Xia Xu, Feng Yu Wang, Roland Lim, MH Toh, Ram Valliappan
Singapore Institute of Manufacturing Technology, Singapore

Almost everyone in the industries has heard of lean and hailed it as a resolution to solve operational issues in production and logistic systems. However, many of those who believe in lean, especially Singapore local Small and Medium Enterprises (SMEs), are facing great challenges to truly apply the lean method for continuous improvement in performance. They need guidance and a suitable methodology to embrace lean so as to be more productive and to better compete in the global market. In this paper, the key success factors for successful lean adoption in Multinational Companies (MNCs) have been identified and the challenges faced by SMEs in pursuing lean are outlined. By understanding current situation in Singapore SMEs and their needs, a specially designed program has been proposed.

An Improved Binary Linear Programming Approach for Life Cycle Assessment System Boundary Identification

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²*Texas Tech University, United States*

According to ISO standards life cycle assessment (LCA) consists of goal definition and scoping, inventory analysis, life cycle impact assessment and interpretation. In goal definition and scoping LCA system boundary is defined. Since LCA is time consuming then there is a need for a systematic approach to determine which processes needed to be included in the system boundary. This paper fulfills the need by proposing an improved binary linear programming model for LCA system boundary identification. The objective function of the model is to minimize the number of processes included in the system boundary and its constraints are the specified mass, energy and economic value ratios. In order to demonstrate its applicability an example is presented. A sensitivity analysis is also conducted in order to illustrate how the change in the specified mass, energy and economic value ratio will affect current optimum system boundary.

Measurement of Manufacturing Effectiveness of a Company Using Analytical Hierarchical Process: A Case Study

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²*National Institute of Industrial Engineering, India*
³*Veeramata Jijabai Technological Institute, India*

Measuring the manufacturing effectiveness (capability) facilitates the firm to know the present status and also provides a pointer to the weak decisions for further improvement. This article presents a case study for evaluating manufacturing capability of a Job Shop Production System (JSPS), where current status (level) of manufacturing capability of a firm based on the consistency of the decisions taken has been computed. For this, hierarchical model based on the overall goal (manufacturing capability) has been adopted by using AHP (Analytical Hierarchical Process) – a MCDM (multi criteria decision making) tool. The manufacturing capability of a firm is computed and then compared with ideally required decisions from the same category of manufacturing system, in order to identify weak decisions. The finding of this research work will be helpful to practitioners and future researchers.

Session	Poster Session 2
Date	12/12/2013
Time	15:00 - 15:30
Room	Krisana

A Conceptual Framework of an Integrated Fuzzy ANP and TOPSIS for Supplier Selection Based on Supply Chain Risk Management

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Currently, many companies require agility in supply chains to manage disruption risks. Supplier selection is one of the most important decisions for the success of firms. It is the first step of the activities in the product realization process starts from the purchase of materials for production and then delivery products to end customers. The objective of this research is to develop a conceptual framework model for supplier evaluation based on an integrated of the fuzzy analytic network process (FANP) model and technique for order performance by similarity to ideal solution (TOPSIS), which incorporates the procurement risk, production risk, deliver risk, and environment risks. The proposed model will be later implemented in a manufacturing firm to priority weight factor and will be presented in a due course.

An Analytic Network Process Model to Support Decision Making in a Pharmaceutical Supply Chain

Virginia Machado, Ana Paula Barroso, Virgilio Cruz-Machado

Faculdade de Ciências e Tecnologia, FCT, Universidade Nova de Lisboa, Portugal

This paper intends to design an Analytic Network Process model to assists managers of different pharmaceutical supply chain entities in identifying and prioritize the management practices they use or should use to achieve a competitive position in the market. The model involves interactions between various criteria for management practice selection. To this purpose a set of clusters and elements related to a Portuguese pharmaceutical supply chain are identified to compose the model and pairwise compared with respect to a given factor.

The results obtained from the proposed model show that the most suitable management practice for the pharmaceutical supply chain studied is "Just In Time" if the lean supply chain management paradigm was implemented and "Promoting visibility throughout the supply chain" if was the agile paradigm. Concerning the key performance measures, "On-Time-In-Full delivery" and "Inventory value" are selected respectively for lean and agile supply chain management.

Economic, Environmental and Social Responsible Supply Chain design Using Differential Evolution Multi Objective Algorithm

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Supply chain networks entail a large amount of investments and that is why they are expected to work for a long time horizon in an economic way. But just considering economic aspects cannot ensure the optimum state of networks design and nowadays, there is a need for considering the other effecting aspects such as environmental and social factors. In this research, we provide a comprehensive mathematical framework of supply chain networks design based on the three above mentioned factors. Our proposed model is made based on certain contributions which are considered especially in social responsible factors. Because of the NP-Hard nature of the problem and since our model is a multi-objective model, a meta-heuristic, namely differential evolution multi objective has been applied to find Pareto-archival solutions. For tuning the parameters of the algorithm, we apply response surface methodology.

Determining and Classifying Drivers of Sustainable Competitive Advantages in Green Supply Chain Management: Resource-Based and Relational Views

Nisakorn Somsuk, Pongtiwa Pongpanich, Sombat Teekasap

Eastern Asia University, Thailand

This paper aims to identify a common set of drivers of green supply chain management (GSCM) which affects sustainable competitive advantages of firms in supply chains, with respect to the specific internal and relational resources of the firm, and to classify these drivers into consensus categories. In this paper, drivers were identified based on a literature review through the lens of two strategic management theories of competitive advantage: resourcebased and relational views. After the literature review, three categories of

resource-based drivers were identified. The Qsort method was then applied to classifying these drivers into categories according to the experts' opinions for the purpose of evoking group consensus on the classifications. The results of this study will be used to develop a theoretical framework and a hierarchical decision making model for the prioritization of these drivers in further research.

Diversification of Supply Chain

James K. C. Chen¹, Tran Nguyen¹, Kaisa Chen¹, Ha Nguyen²

¹Asia University, Taiwan

²Foreign Trade University, Viet Nam

The supply chain (SC) will be considered as a competitive strategy and one of the most useful methods by which companies can deliver products to customers effectively, all aspects of great are really importance to companies. However, each company has its own business scale and market areas, the supply chain model must vary to accommodate those dissimilarities. The contributions of the paper are three-fold: introducing three different types of enterprises concerning market regions, examining three types of supply chain models and developing a specific role of entities in the models. Some Small and Medium sized and effectively, are virtually important to companies. Enterprises (SMEs), which have not established a certain SC, may choose a suitable model. This paper draws up three models of SC for enterprises referring

Reverse Logistics: A Business Opportunity in Time of Crisis

Manuel Monterrey, David de la Fuente, Isabel Fernandez, Jose Parreno,

Rafael Rosillo

University of Oviedo, Spain

The current project is aimed at analyzing the possibilities of the Reverse Logistics as a new market niche in industry through the creation of a standard industrial estate that clusters several activities related to the industrial waste appreciation and that can be benefited from the economies of scale, from the synergies obtained between the companies settled there and the collaboration of public authorities. The results obtained show that the initiative also represents a business opportunity for the promoters, when there is a serious crisis in the sector, especially in Spain.

A Practical Supply Chain Risk Management Approach using VaR

Jasmine Jiamin Lim, Allan Nengsheng Zhang, Puay Siew Tan

Singapore Institute of Manufacturing Technology, Singapore

In these recent years, the complexity of supply chain has been increasing with globalisation and as such, disruptions are happening more frequently with the impacts getting more severe. Thus, there is a growing need to deal with such risks arising from disruptions to the supply chain. The objective of this paper is to present a practical method for supply chain risk management using Value at Risk (VaR), a technique to identify, assess and mitigate these disruption risks. The method aims to tackle possible risks through the application of VaR and provides deterrent solutions. Through this method, firms will be able to conduct "what-if" analysis to manage potential risks and thus minimizing the impact of the risks to their supply chains during the sudden occurrence of disruptions.

Optimal Design of Sewer Network by Tabu Search and Simulated Annealing

Shuang-Fu Yeh, Yao-Jen Chang, Min-Der Lin

National Chung Hsing University, Taiwan

Optimal sewer network designs are NP-hard and highly complicated nonlinear problems. Conventional optimization techniques often easily get bogged down in local optima and cannot successfully address such problems. In the past decades, heuristic algorithms with robust and efficient global-search capabilities have helped to solve continuous and discrete optimization problems and have demonstrated considerable promise. This study applied tabu search (TS) and simulated annealing (SA) to the optimization of sewer-network designs. As a case study, it applied to solve a benchmark sewer network optimization problem reported in the literature. The optimal configuration of TS and SA parameters were determined by systematically evaluating the relative computational performance of TS and SA. Characteristic analysis was undertaken and solution qualities from different algorithms were also compared. The results show that SA is able to obtain optimal sewer network designs better than those methods previously reported in the literature.

An Improved Variable Neighborhood Search for the Open Vehicle Routing Problem with Time Windows

Anak Agung Ngunah Perwira Redi, Meilinda Fitriani Nur Maghfiroh, Vincent F. Yu

National Taiwan University of Science and Technology, Taiwan

This paper considers the open vehicle routing problem with time windows (OVRPTW). An improved variable neighborhood search (VNS) algorithm is proposed to solve the problem. The improved VNS features a route construction mechanism to ensure the customers with earlier time windows will be served first. The results of computational study indicate that the proposed algorithm can solve OVRPTW effectively.

The Impact of Managers Selection Criteria on Quality of Capabilities: Are Managers only for Representative Function?

Mait Rungi

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Dynamic capabilities represent every change-oriented routine action in company. Dynamic capabilities are widely used due to their aim to cope with dynamical changes, which happen often/regularly. Managers and employees are behind of most companies' actions. While earlier research has emphasized more capabilities selection than their development techniques, then it makes managerial decisions especially important. This research investigates empirically how manager selection criteria influence goodness of capabilities. Managerial criteria influence more on top-management related issues and less middle-management issues. Interestingly, prior education and experience are not as much important than fit with organization, however, latter is hard to evaluate ex-ante - at selection. Formal academic degree/certification of managers is more evaluated than the real education. Companies do not evaluate highly selection criteria such as creativity, entrepreneurship. Also, it is like that human resource management is not closely tied with dynamic capabilities.

Friction Between Foot and Floor Under Barefoot Conditions: a Pilot Study

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An experiment was conducted in the laboratory to measure the force plate-based coefficient of friction (COF) between the foot and floor. A female human subject participated in the study. She was sitting with her thigh horizontal and her shank was in a vertical position. Her foot was on a tested floor which was mounted on a Bertec® 4060 force platform in front of her. There were four types of floors and three floor surface conditions. The subject slide her foot with either fast or slow sliding speed using either her left or right foot. The force plate-based COF between the foot and floor was calculated. The results found that the floor, surface condition, and sliding speed were all significant factors affecting the force plate-based COF. The surface condition was the most significant factor among all the factors considered in this study. The difference between the left and right foot was not significant.

A Discussion of Multiple Learning Effects and Unconscious Behavior in the Software Debugging Process with Variable Potential Errors and Change-points

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Cognitive learning has been applied in various fields for the purpose of discussing human behavior. In this study, we employ learning functions in software reliability growth models (SRGMs) and consider the conscious/unconscious behavior and multiple learning effects in the models simultaneously to discuss the influence of learning effects on work performance in software debugging projects and also the influence of variations in the environment on learning effects. The models are based on Chiu's models (2011) and employed a sine function (Huang, 2011) to describe the variable potential errors and to judge change-points in the software debugging process. The results showed almost perfect fitting for the models to the actual data sets, which means the staff engaged in software debugging projects have not only conscious learning effects but also unconscious behavior that can describe variable potential errors and explain the change-points in a software debugging process. This paper also examines the effectiveness of the proposed models and discuss when and what kinds of learning effects occur and how these influence software reliability those help managers to master the software debugging process, the performance of the staff involved in this process, the reliability of the software system, and in the employment of suitable methods to manage organizations.

Determinants of Adopting Mobile Internet TV in Bangkok

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This research identifies the elements people consider important in their decision to adopt mobile internet TV. A theoretical framework was developed to describe adopting Internet TV via mobile device. The constructs used in the research model were Perceived Usefulness and Perceived Ease of Use, based on consumers' cognitive judgments of the service or the technology, from Technology Acceptance Model (TAM). The findings enable mobile operators to find the best way in developing current mobile data service and also preparing for mobile TV service which will be provided by TV broadcasting operator to serve 4G mobile technology in Thailand in the near future. Broadcasting TV service on 4G frequency to mobile user devices would be the origin of convergence between Telecommunications and Broadcasting.

Work Value and Motivation Mediate the Influence of Personality on Contextual Performance

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From the perspective of personality framework, the mediating effects of personality dynamic variables (values and motivation) on the relationship between personality traits and contextual performance were tested in 291 employees in different foreign enterprises in China through questionnaires. The results show that 1) competence and growth values mediate the effect of Big Five on contextual performance; 2) status and independence values (indirectly through intrinsic motivation) mediate between openness, conscientiousness and contextual performance; 3) intrinsic motivation mediates between competence and growth values, status and independence values, and contextual performance.

The Associations between Emotional Intelligence and Academic Achievement: Mediator or Moderator effect of Learning Adaptability

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Objective: The purpose of this study was to explore the characteristics of the relationship between emotional intelligence and academic achievement, as well as to examine whether learning adaptability was a moderator or mediator between them. Methods: 610 college students were investigated by questionnaires consisted of emotional intelligence scale and college students' learning adaptability scale. Results: (1) Emotional intelligence was significantly associated with academic achievement ($r = 0.36, p < 0.01$). (2) Learning adaptability played partly a mediator role between emotional intelligence and academic achievement, but the moderator effect was not significant. Conclusion: The individuals with high emotional intelligence are able to obtain high learning adaptability, and high academic achievement.

Lower Bounds for Estimating Workforce Size in a 24/7 Company

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A company providing services in a 24/7 basis faces the problem of determining what are the workers prerequisites per shift, and after that estimating the lower bounds of workforce size that could provide the continuous service. In this paper we solve the estimating problem according to characteristics of the contraction, vacation period and degree of absenteeism.

The Effect of Sound on Job Performance

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Industrial factories involves in their equipment or machinery can be noisy places and exposing employees to conditions can affect their job performance and health quality. Noise exposure in the workplace might have resulted in long-term workers' health problems; occupational diseases. Designers, managers or people responsible for safety of work should take into account possible danger of sound effect during designing future workplaces. This article reports the results of a questionnaire survey that investigated sound as a physical factor and if its effect is solved in production factories. The sample of 69 respondents included especially production factories having mostly assembly workplaces. The results confirm the hypothesis solving a workplace assessment and sound impact on job performance. Results of the survey were confirmed by case study that was carried out in the processing plastics manufacturing company.

Evaluation of a Collision Avoidance Display to Support Pilots' Mental Workload in a Free Flight Environment

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Air traffic is expected to double in the next two decades. The possibility of pilots' mental workload and midair collisions will increase therefore. To support the growing air traffic under the free flight environment, new systems, procedures and self-separation as compared to current Air Traffic Management System will be introduced. Pilots' self-separation is a new task. This new task may pose a challenge to both pilots and air traffic controllers (ATC) in conflict situations. Thus, imposes a new mental workload. An innovative collision avoidance display has been developed to support pilots' mental workload in a free flight environment. An experiment was conducted to evaluate the effectiveness of Flight Collision Avoidance System (FCAS) display as compared with a contemporary instrumentation. The results suggest a decrease in pilots' mental workload is a viable proposition for complex flight tasks.

Selection of Sub-contractors of the Project While Minimizing Settlements of Contractual Penalties and Success Fees

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Most of today's projects are interdisciplinary and requires the involvement of contractors that specialize in different types of works. In various circumstances, it may be advisable to minimize their multiplicity or their diversification. In some cases it may be desirable to meet certain characteristics by contractors for selected tasks.

The aim of this paper is to determine the model of selection of contractors in complex project from the point of view of the project owner or general contractor. As a methodological basis we use the multi-criterial decision model assigning each task to specific contractors in the project with the function of distribution of penalties arising from delayed completion and potential benefits in the event of early termination of the project.

Which Dynamic Capabilities Needed for Successful Promote of ERP Activity?

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Although many scholars have proposed all kinds of key success factors (KSFs) of an ERP (Enterprise Resource Planning) activity in enhancing the smooth introduction of ERP into the enterprise, the factors that are based too much on concept and protocol cannot help an enterprise to solve the problems encountered during the introduction process. Therefore, in this research, through the literature review and qualitative interview method, 68 items of key success factors and 11 types and 48 factors of dynamic capability architecture were proposed. Next, under the PDCA management cycle, this research integrated the two above mentioned results to set up a dynamic capability model of key success factors for ERP introduction so as to exhibit the kind of dynamic capability needed for each key success factor. This result not only creates practical value for the factors in question, but also displays implementable effectiveness for the dynamic capability concept. Therefore, this also brings a new direction to the academic research.

An Extended Risk Matrix Approach for Supply Chain Risk Assessment

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Risk assessment is important for ranking risks properly and allocating limited resources to mitigate critical risks. The paper reviews the risk assessment approaches with a focus on the advantages, limitations and applications of the Risk Matrix Approach (RMA). The paper then proposes an extended risk matrix approach (ERMA) for supply chain risk assessment. The purpose is to overcome the limitations of traditional RMA, enrich the features and improve its applicability in supply chain risk management (SCRM). In the proposed approach, new imensions of risk metrics - detectability and recoverability - are incorporated to capture the complexities of supply chain risks which are important to supply chain managers. The new approach is tested out in a case study of a MNC supply chain and the key findings are presented.

A Comparison Between the Sprinklers Nozzles Dimensioning Imposed by the European and the American Fire Safety Norms – Case Study: A Warehouse Containing Plastic

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The fire safety engineering (FSE) has improved the design of many industrial systems. In this study, the FSE approach is applied to an inventory of plastic materials to determine the best design solutions for the sprinklers nozzles used. In particular it is demonstrated the safety equivalence between the sprinklers' nozzles imposed by the European norms and the ones imposed by the American norms. This result leads to a more efficient way to design the extinguishing systems for the warehouses.

An Application of Learning Effects for Assessing Work Performance Using a Software Reliability Growth Model with Multiple Change-points

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Learning effects exist with regard to various behaviors, and especially work-related processes. This study measures the performance of a software testing project with time-varying effects using a software reliability growth model (SRGM), and discusses the changes in learning effects parameters with change-points in the model. We employ Chiu's (2011) model to construct the time-varying learning effects and measure the performance of the software testing project using the data set in Huang (2010). This paper also discusses the time-lag between error-detected and error removed that exists with different learning concepts. The results indicate that error-removed requires more cognitive learning process time, and this information can be used to help project managers mastering the staff and the process of software testing, efficiently.

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TRANSPORT SERVICES

Bangkok Airport Link:

This Airport Rail Link connects downtown Bangkok with Suvarnabhumi International Airport. There are three Airport Rail Link lines – two SA Express Lines and the SA City Lines. The Express Lines are faster as they each have only 2 main stops. The SA City Lines take longer but are more affordable. Depending on which route you take, your journey will last about 15 – 30 minutes.

Bangkok MRT:

The Mass Rapid Transit network (MRT) has 18 stations and stretches from Hua Lamphong in the South to Bang Sue in the north. Trains arrive at intervals of 5-7 minutes and connect with the BTS Skytrain at Sukhumvit and Silom stations.

BTS Skytrain:

This is one of the main modes of transport throughout Bangkok. There are two BTS Lines, known as the Silom Line and the Sukhumvit Line. The Silom Line runs west to south, while the Sukhumvit Line runs from north to east. Please note that the trains can become quite crowded during peak hours, so you may want to avoid travelling by train during these timings.

Taxi:

Travelling by taxi is the easiest and most convenient way to move around Bangkok. Available taxis are recognizable by their glowing red vacancy signs. However, do bring a map with you in case of language barriers between you and the driver.

Conference Tours

BANGKOK TEMPLES & CITY TOUR

Tuesday, 10 December, 2013 (1:00PM – 4:00PM)

USD40 / SGD50 / THB1,250 per person

Price Includes: *English Speaking Guide, Entrance Fee to all places mentioned in the tour description, Bottle Water on vehicle, Transportation to/from hotel*

This tour will bring you to three of the most distinguished temples in Bangkok after the most prominent ones like the Emerald Buddha Temple at the Grand Palace. Wat Trimitr, the temple of the Golden Buddha. The statue is made from solid Gold weighing 5.5 tons. It is a fine example of Sukhothai art and was discovered by chance from a layer of stucco during construction of the temple. Passing through Chinatown your next stop is Wat Po, the temple of the reclining Buddha which is the largest and oldest in Bangkok. Your last stop is at Wat Benchamabopit or the marble temple.

DINNER CRUISE BY TRADITIONAL RICE BARGE

Tuesday, 10 December, 2013 (6:00PM – 9:00PM)

USD70 / SGD80 / THB2,200 per person

Price Includes: *Transportation to/from hotel – cruise pier, Buffet Dinner on Board Cruise (Excludes beverage/bar)*

Relax in modern comfort while you slowly cruise along the River of Kings – Chao Phya River passing the temple of dawn (Wat Arun), Grand Palace and life along the river as it slowly starts to unwind after a busy day. You will be served a Thai cuisine catered by the 5* hotel on this dinner cruise. A traditional Thai classical music will be played throughout the evening for your enjoyment.

CHAO PHRAYA DINNER CRUISE

Wednesday, 11 December, 2013 (6:00PM – 9:00PM)

USD50 / SGD60 / THB1,500 per person

Price Includes: *Transportation to/from hotel – cruise pier, Buffet Dinner on Board Cruise (Excludes beverage/bar)*

Treat yourself to a memorable night on board one of Bangkok's most luxurious restaurant boats. A welcome Thai Traditional Dance will start the night before you treat yourself with the sumptuous buffet featuring Thai and International cuisine. After your meal, enjoy the house band that will keep you entertained throughout the night until you return back to the pier.

AYUTTHAYA EXPERIENCE

Friday, 13 December, 2013 (7:30AM – 4:30PM)

USD70 / SGD80 / THB2,200 per person

Price Includes: *English Speaking Guide, Return transportation – land and water as mentioned in the program, Entrance fees to all places visited mentioned in the program, Meal(s) as mentioned in the program exclude beverage*

Located 86 kilometres north of Bangkok Ayutthaya was Thailand's capital from 1350 to 1767 until it was invaded by Burma. It is full of ancient relics and historical temples and monuments ruins which are still quite spectacular. You will be visiting Summer Palace of Bang Pa-In. The palace was originally used by the royal family as a summer retreat during Ayutthaya Period. It was destroyed during the downfall of Ayutthaya and was restored by the fourth king of Rattanakosin Kingdom (current Chakri Dynasty of Thailand). Inside the palace, there are many impressive buildings and gardens, derived from the East and West cultures.

International Buffet Lunch will be provided on board of the cruise (joined cruise) which will take you back to Bangkok during this 2.5 hours cruise. Sit back and relax during this cruise journey while catching a glimpse of the river life along the way.

COMPANY VISITS

Friday, 13 December, 2013 (9:00AM – 12:00PM)

USD20 / SGD25 / THB650 per person

Price Includes: *Transportation to/from hotel and Refreshments*

(A) Company Visit to PTT

PTT Public Company Limited (or PTT) and its subsidiaries operate a comprehensive petroleum and petrochemical business along an entire supply chain of the petroleum business. This includes exploration and production of crude oil, managing crude oil tankers, operating refineries, petrochemical plants, petroleum terminals and transmission pipelines, service station network as well as conducting international trading. PTT is one of the largest corporations in the country and also the only company from Thailand that is listed in the Fortune Global 500 companies. In 2012, PTT won 89 awards, prestigious rankings in operational excellence, and certificates from 44 national and international institutions.

(B) Company Visit to CP-All

CP All Public Company Limited was established in 1988, which is the flagship company of the Charoen Pokphand Group's marketing and distribution business. CP-All's main business is operating convenience stores under the "7-Eleven" trademark in Thailand. Its competitive advantage lies in its extensive store network and with outlets in prime locations scattered across the country. Modern management and information technology systems further enhance customer satisfaction by offering efficient and speedy services. With its well-managed regional distribution centers, it enhances the efficiency of the supply chain system which supports timely and efficient product distribution to its stores to serve customers' needs in a timely manner.

In & Around Bangkok

Temples in the City



Bangkok is renowned for its beautiful Buddhist temples, the beauty of the architecture and fine craftsmanship forms a unique part of the capital's heart and soul. "Wat Phra Kaeo" (Temple of the Emerald Buddha) is a royal temple of national significance and remains a major tourist attraction. Next to it, "Wat Pho" (Temple of the Reclining Buddha) is one of the oldest and largest Buddhist temples in Bangkok. Most prominent feature on west bank of Chao Phraya river would be "Wat Arun" (Temple of Dawn), which is decorated with tiny pieces of coloured glass and Chinese porcelain placed delicately into intricate patterns.

Local Delicacy



Apart from restaurants, you will find food almost anywhere in Bangkok, rows of food carts along the streets, pavement eateries with fold-up tables and chairs, and in the smallest of 'Sois' (lanes). Thai Street Food provides convenience and relatively affordable to the locals. Head to Chinatown (also known as "Yaowarat") for the well-known authentic Thai local style cuisine and experience communal eating surrounded by traffic and urban life.

Floating Market



Floating markets offer fascinating cultural experiences as well as glimpses into the local way of life of a bygone era. Narrow canals are filled with flat wooden boats piled high with tropical fruit and vegetables, fresh, ready-to-drink coconut juice and local food cooked from floating kitchens located right on the boat. Damnoen Saduak is the most popular floating market in Thailand. An early morning start is worth to avoid the heat and catch Damnoen Saduak at its liveliest.

Beyond Bangkok



Looking for an escape from the city buzz of Bangkok? You may explore many places outside Bangkok in under an hour or two. One of the popular beach-resort destinations would be Pattaya, which is a two hour drive from Bangkok. With wide array of water sports and activities, the lively beach town is able to draw hundreds of thousands of visitors each year. For more laid-back alternative, one would choose to visit Hua Hin where you get to enjoy spectacular sunrises and beautiful, powdery sand beach.



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เดียวกับการผลิตเชื้อเพลิงสังเคราะห์อากาศยาน จุดระเบิดเร็วกว่าด้วยสารเติมแต่ง
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ล่าสุด รองรับรถยนต์ที่มีระบบ DPF* (Diesel Particulate Filter) ให้สมรรถนะ
แรงขึ้นตั้งแต่เปิดตัว แรงไม่มีตกถึงแรงปลาย เพื่อรถดีเซลสมรรถนะสูงโดยเฉพาะ



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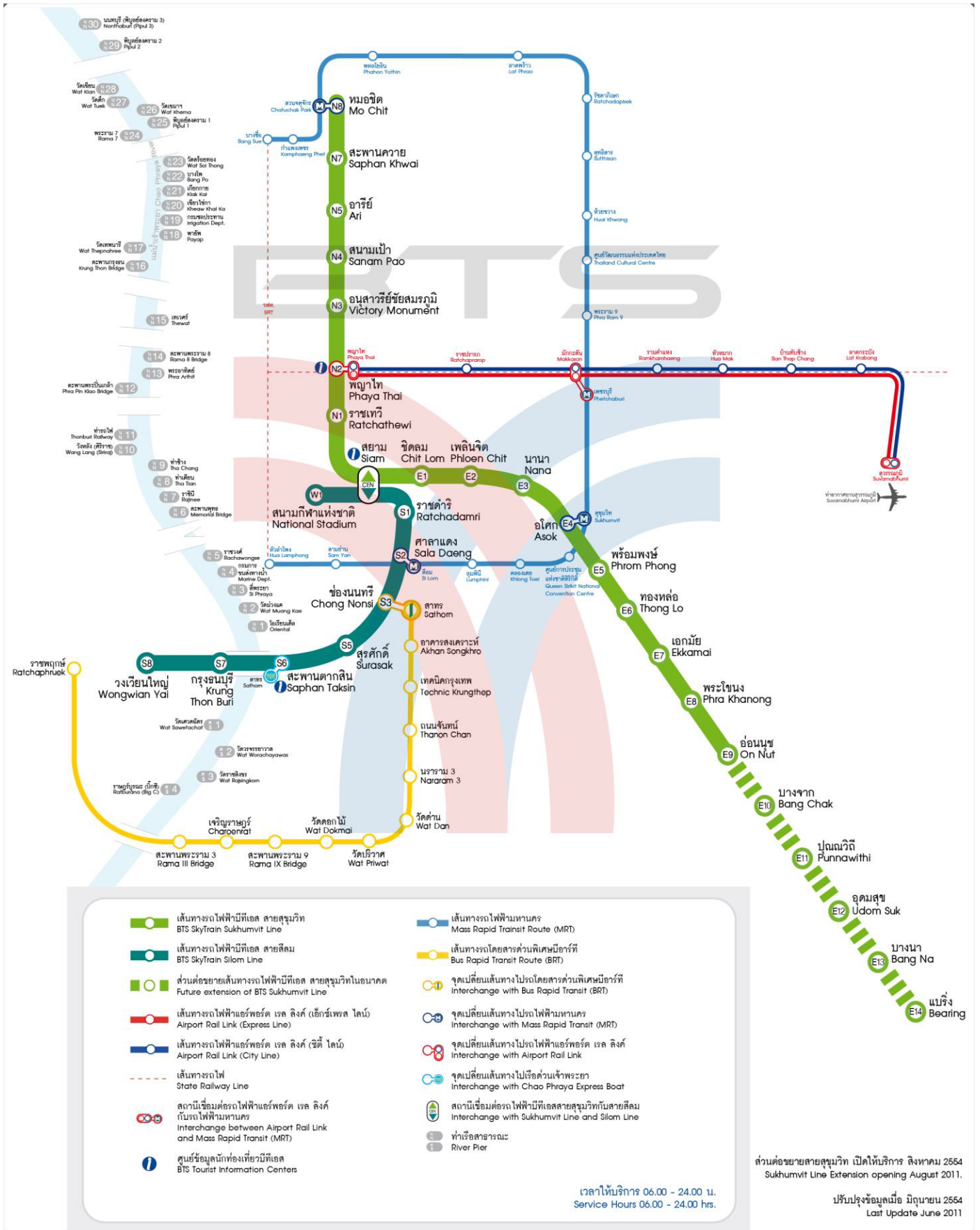
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