IEEM 2014

2014 IEEE International Conference on Industrial Engineering and Engineering Management

9 - 12 December 2014, Malaysia

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Tel: +60 3 7492 8000
Email: enquirysrhs@sunwayhotels.com
Website: http://kualalumpur.sunwayhotels.com/

IEEM 2014 PROGRAM OVERVIEW

Tuesday 9 December	KL City Orientation Tour Conference Registration Welcome Reception KL By Night Tour
Wednesday 10 December	Conference Registration Official Opening Keynote Presentations Technical Sessions
Thursday 11 December	Conference Registration Technical Sessions Conference Banquet
Friday 12 December	Technical Visit to PKT Logistics Countryside Tour

Welcome Message

Welcome to Malaysia and the 2014 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM2014).

IEEM2014 is the ninth in the series of IEEM conferences since 2006. It is the first time the conference is jointly organized by IEEE Technology Management Council Malaysia and Hong Kong Chapters. The conference is supported by Monash University and the City University of Hong Kong.

The strength of IEEM conference is its high conference standard and diversity, bringing together researchers and practitioners from different branches of industrial engineering and engineering management from around the world. In keeping a high standard as for the past IEEM series, each paper went through a rigorous review process. IEEM2014
received almost 550 submissions and each paper was sent to 3-5 reviewers. The acceptance decisions were made based on at least two consistent recommendations. To represent the global diversity, we have an outstanding program, including 20 topics presented in oral and poster sessions, as well as a distinguished set of keynote speakers:

Hean Teik Chuah, President, Universiti Tunku Abdul Rahman (UTAR), Malaysia, will present "Science, Engineering, Technology & Innovation (SETI) Education for Economy Transformation."

Tariq S Durrani, Research Professor, University of Strathclyde, United Kingdom, will discuss "Science, Engineering, Innovation and Competitiveness - An international assessment and comparison."

Thomas L. Magnanti, President, Singapore University of Technology and Design (SUTD), Singapore, will highlight "Educating Technology Leaders for Design-Driven Innovation."

The organising committee is very grateful to Professor Hean Teik Chuah, Professor Tariq S Durrani and Professor Thomas L. Magnanti to deliver their keynote speech at this conference. We would like to thank all the authors and participants for their contribution and support. We would also like to acknowledge the contribution by technical programme committee members and the reviewers for their help in the review process.

We hope you enjoy the conference and the cultural and scenic experiences in Malaysia.

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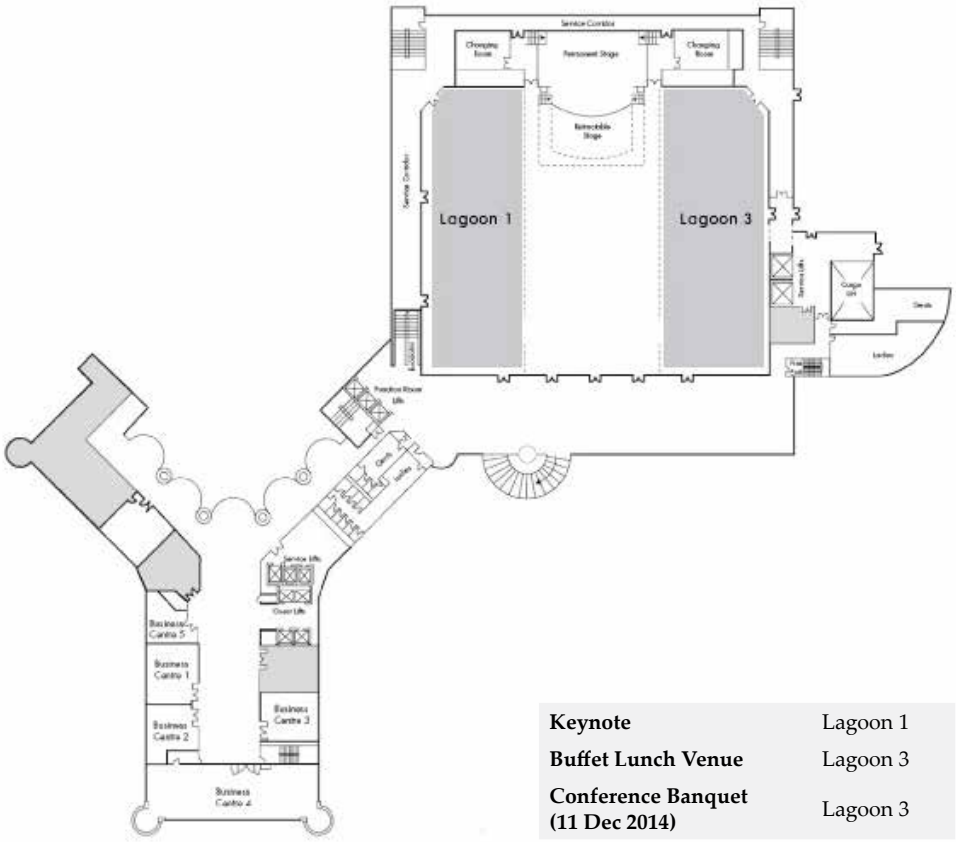
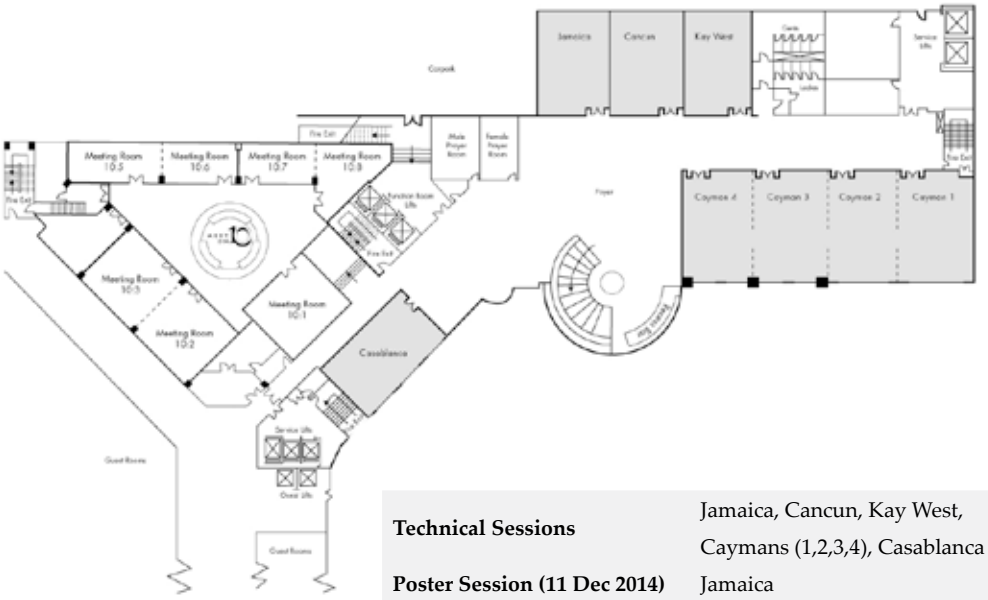
Plenary Sessions and Lunch – Level 15



Keynote	Lagoon 1
Buffet Lunch Venue	Lagoon 3
Conference Banquet (11 Dec 2014)	Lagoon 3

Technical Sessions – Level 10 Meeting Rooms



Technical Sessions	Jamaica, Cancun, Key West, Caymans (1,2,3,4), Casablanca
Poster Session (11 Dec 2014)	Jamaica

Program Overview

Time	Tuesday, 9 December 2014
08:30 - 13:30	**KL City Orientation Tour** *Ticketed Event, Please present ticket to board tour* (Help Desk Opens at 07:30; Closes 08:30)
14:00 - 17:30	Conference Registration – Foyer (Level 10)
15:30 - 17:30	IEEM2014 Welcome Reception (Please see registration desk)
18:00 - 23:00	**KL By Night Tour** *Ticketed Event, Please present ticket to board tour* (Help Desk Opens 17:00; Closes 18:00)

Time	Wednesday, 10 December 2014
07:30 - 08:50	Conference Registration - Foyer (Level 10)
Room	**Lagoon 1 Ballroom, Level 15**
08:50 - 09:00	**Opening Ceremony (Lion Dance)**
09:00 - 09:45	**Conference Opening**
09:45 - 10:30	**Keynote I** "Science, Engineering, Technology & Innovation (SETI) Education for Economy Transformation" **Hean Teik Chuah** *President, Universiti Tunku Abdul Rahman (UTAR), Malaysia*
10:30 - 11:00	Coffee/Tea Break – Foyer (Level 10)
Room	**Lagoon 1 Ballroom, Level 15**
11:00 - 11:45	**Keynote II** "Science, Engineering, Innovation and Competitiveness - An international assessment and comparison" **Tariq S Durrani** *Research Professor, University of Strathclyde, United Kingdom*
11:45 - 12:30	**Keynote III** "Educating Technology Leaders for Design-Driven Innovation" **Thomas L. Magnanti** *President, Singapore University of Technology and Design (SUTD), Singapore*
12:30 - 13:30	Lunch - Lagoon 3 (Level 15)

Rooms	Casablanca	Caymans 1	Caymans 2	Caymans 3	Caymans 4	Jamaica	Kaywest	Cancun
13:30 - 15:00	Decision Analysis & Methods I	Operations Research I	Quality Control & Management I	Supply Chain Management I	Technology & Knowledge Management I	Healthcare Systems & Management	Systems Modeling & Simulation I	Human Factors I
15:00 - 15:30	Coffee/Tea Break - Caymans Foyer (Level 10)							
Rooms	**Casablanca**	**Caymans 1**	**Caymans 2**	**Caymans 3**	**Caymans 4**	**Jamaica**	**Kaywest**	**Cancun**
15:30 - 17:00	Decision Analysis & Methods II	Operations Research II	Service Innovation & Management I	Manufacturing Systems I	Information Processing & Engineering I	Intelligent Systems I	Project Management I	Production Planning & Control I

Time	Thursday, 11 December 2014							
07:30 - 09:00	Conference Registration - Foyer (Level 10)							
Rooms	**Casablanca**	**Caymans 1**	**Caymans 2**	**Caymans 3**	**Caymans 4**	**Jamaica**	**Kaywest**	**Cancun**
09:00 - 10:30	Panel Sessions	Operations Research III	Quality Control & Management IV	Supply Chain Management II	Information Processing & Engineering II	All Day Poster Display	E-Business & E-Commerce	Safety, Security & Risk Management
10:30 - 11:00	Coffee/Tea Break – Foyer (Level 10)							
Rooms	**Casablanca**	**Caymans 1**	**Caymans 2**	**Caymans 3**	**Caymans 4**	**Jamaica**	**Kaywest**	**Cancun**
11:00 - 12:30	Decision Analysis & Methods III	Operations Research IV	Service Innovation & Management II	Supply Chain Management III	Technology & Knowledge Management II	All Day Poster Display (cont'd)	Reliability & Maintenance Engineering	Production Planning & Control II
12:30 - 13:30	Lunch - Lagoon 3 (Level 15)							
Rooms	**Casablanca**	**Caymans 1**	**Caymans 2**	**Caymans 3**	**Caymans 4**	**Jamaica**	**Kaywest**	**Cancun**
13:30 - 15:00	Decision Analysis & Methods IV	Global Manufacturing & Engineering	Quality Control & Management II	Manufacturing Systems II	Information Processing & Engineering III	All Day Poster Display (cont'd)	Project Management II	Human Factors II
15:00 - 15:30	Coffee/Tea Break – Foyer (Level 10)							
Rooms	**Casablanca**	**Caymans 1**	**Caymans 2**	**Caymans 3**	**Caymans 4**	**Jamaica**	**Kaywest**	**Cancun**
15:30 - 17:00	Decision Analysis & Methods V	Operations Research V	Quality Control & Management III	Manufacturing Systems III	Technology & Knowledge Management III	All Day Poster Display (cont'd)	Systems Modeling & Simulation II	Intelligent Systems II
18:30 - 22:00	**Conference Banquet** - Lagoon 3 (Level 15) *Ticketed Event, please present ticket at gate*							
Time	**Friday, 12 December 2014**							
08:00 - 13:00	**Technical Visit to PKT Logistics** *Ticketed Event, please present ticket to board coach* (Help Desk Opens 07:30; Closes 08:00)							
14:00 - 19:00	**Countryside Tour** *Ticketed Event, please present ticket to board coach* (Help Desk Opens 13:00; Closes 14:00)							

Keynote Speaker

Wednesday - 10 December, 09:45 to 10:30
Lagoon 1 Ballroom, Level 15

"Science, Engineering, Technology & Innovation (SETI) Education for Economy Transformation"

Hean Teik CHUAH
President
Universiti Tunku Abdul Rahman (UTAR), Malaysia

Abstract

SETI Education has always been the driving force of human civilizations. This paper starts with a random walk on the achievements of SETI for the last century, and current trends in a globalised world. It also touches on the booming trends and challenges faced such as widening gap in wealth distribution, global warming, availability of clean water, and inequality in food distribution. The way forward is to focus on SETI education, which is the key for human resource development, catalyst of change and innovation, and driver of economy growth. It shares some facts and figures on the higher education landscape in USA and some Malaysian experiences in SETI human resource development. Finally the presentation covers global mobility of engineering professionals and suggests that engineering professionals should have 3IC's as their guiding principles: Integrity & Competence; Integration & Communications; and Internationalisation & Cooperation.

Biography

Dr. Chuah Hean Teik graduated with a BEng (First Class Honours), MEngSc and PhD in electrical engineering, all from University of Malaya, Malaysia, in 1986, 1988 and 1992, respectively. Since April 2008, he has been appointed as President of Universiti Tunku Abdul Rahman (UTAR) in Malaysia. His research interests include microwave remote sensing, applied electromagnetics, and wave propagation for indoor and outdoor communications. He has authored/co-authored more than 250 papers in international journals and conferences. Dr. Chuah has received many awards, both locally and internationally such as the inaugural Young Engineer Award by the Institution of Engineers, Malaysia in 1991; the 1993 Young Scientist Award at the 24th General Assembly of URSI at Kyoto, Japan; the 1995 Young Scientist Award (Industrial Sector) by the Malaysian Ministry of Science, Technology and the Environment; the 1999 Malaysian Toray Science Foundation Science and Technology Award for his contributions in the area of microwave remote sensing; 2011 IET Malaysia Outstanding Achievement Award; Rotary Charity Foundation of Kuala Lumpur Research Gold Medal 2012 for excellence in original research and significant achievement in the field of electrical engineering; and most recently the Distinguished Engineer Award by the Institution of Engineers Malaysia Penang Branch. For his significant contribution in engineering profession, he was awarded Honorary Doctor of Engineering by Multimedia University in August 2013. Dr. Chuah is an eminent technical leader and is very active in professional bodies. He is currently the President of the Federation of Engineering Institutions of Asia and the Pacific (FEIAP). He was the President of the Institution of Engineers, Malaysia (2009-2011). He is a Senior Fellow of the Academy of Sciences, Malaysia; Hon. Fellow of the ASEAN Federation of Engineering Organisations and the Institution of Engineers Malaysia; a Founding Fellow of the ASEAN Academy of Engineering and Technology; Fellow of the Remote Sensing & Photogrammetry Society, UK; the Institution of Engineering and Technology, UK; the Institute of Electrical and Electronics Engineers, USA; and the Electromagnetics Academy, USA. He is also a Professional Engineer in Malaysia, a Chartered Engineer registered with the Engineering Council, UK; an APEC, EMF and ASEAN Engineer; and Hon. Member of the Golden Key International Honour Society. Dr Chuah is the current Chair of the IEEE GRS Chapter in Malaysia.

Wednesday - 10 December, 10:30 to 11:30
Lagoon 1 Ballroom, Level 15

"Science, Engineering, Innovation and Competitiveness - An international assessment and comparison"

Tariq S DURRANI
Research Professor
University of Strathclyde, United Kingdom

Abstract

This presentation is concerned with a comparative assessment of policies and strategies currently being employed by a number of nations to promote science, technology and innovation as a vehicle for wealth creation and prosperity. Research and Innovation Systems are increasingly seen as key drivers for growth and wealth creation. The work covers the initiatives being taken by the UK Government to stimulate the economy by fostering innovation, and includes a study of policies implemented by the governments of Canada, USA, Germany and China, and an evaluation based on performance indicators developed by the European Commission's Innovation Union Scoreboard. The presentation will also touch on how Innovation is evolving in Asia, and the work of OECD in identifying trends and features of policy instruments to encourage science, technology and innovation.

Biography

Tariq Durrani is the Vice President (International) Royal Society of Edinburgh-the national academy for sciences and letters for Scotland, and Research Professor at the University of Strathclyde in Glasgow UK. Prior to this he was the Vice President (Natural Sciences) at the Royal Society of Edinburgh from 2007-2010.

He joined the University of Strathclyde as Lecturer (1976); appointed Professor (1982); Department Head (1990-1994); Deputy Principal (2000-2006), with major responsibility for University-wide strategic developments in Computing/ Information Technology infrastructure, Entrepreneurship, Staff Development and Lifelong Learning.

He has authored 350 publications; conducted collaborative research with industry, partnered in major European research programs; supervised 40 PhDs; had visiting appointments at Princeton, University of Southern California, Stirling, and UESTC Chengdu; and consulted for UK, Netherlands, Portugal, UAE, US, and European Union governments. His research includes Signal & Image Processing, Technology and Education Management.

Tariq Durrani has been a Board member and Director of United Kingdom National Commission for UNESCO, the Glasgow Chamber of Commerce, the Scottish Funding Council; the UK Leadership Foundation for Higher Education, the UK Equality Challenge Unit.

He has been active in professional societies, being President of the IEEE Signal Processing Society (1994-1995); President IEEE Engineering Management Society (2006-2007), and Director and Vice President of the IEEE Educational Activities Board (2010-2011).

He is a Fellow of IEEE, UK Royal Academy of Engineering, Royal Society of Edinburgh, and IET; and is VP of Royal Society of Edinburgh (2012-2014).

In 2003 Queen Elizabeth honoured him with the title OBE (Officer of the Order of the British Empire)" for services to electronics research and higher education."

Keynote Speaker

Wednesday - 10 December, 11:30 to 12:30
Lagoon 1 Ballroom, Level 15

"Educating Technology Leaders for Design-Driven Innovation"

Thomas L.MAGNANTI
President
Singapore University of Technology and Design (SUTD), Singapore

Abstract

Technology and design-driven innovation have always been vital to society's prosperity and well-being and will continue to be so in essentially all areas of importance to society. Education in this general arena has evolved over hundreds of years, with the emergence within engineering and management of particular disciplinary and departmental structures and teaching paradigms. These include programs in industrial engineering and engineering management. Are these the best approaches in today's world? How should a contemporary technical-based university be structured? What degrees should it offer and how should it be delivering education? Using MIT and the development of the Singapore University of Technology and Design as reference points, I will touch upon these issues in the context of the changing landscape of higher education.

Biography

Thomas Magnanti is the founding President of the Singapore University of Technology and Design (SUTD), and Institute Professor and former Dean of Engineering at M.I.T. He has devoted much of his professional career to education that combines engineering and management, and to teaching and research in applied and theoretical aspects of large-scale optimization.

At SUTD, he has led the development of a university whose mission is to advance knowledge and nurture technically-grounded leaders and innovators to serve societal needs, through a focus on Design and an integrated multi-disciplinary curriculum and multi-disciplinary research.

At M.I.T. he was the founding co-director of MIT's Leaders for Manufacturing and System Design and Management Programs, and founding director of the Singapore-MIT Alliance for Research and Technology (SMART). As Dean, he was instrumental in creating the Deshpande Center for Technological Innovation and was a strong advocate and supporter of programs in entrepreneurship such as the MIT 100K competition. He also headed one third of the Sloan School of Management for several years.

He has served as president of three major professional societies and as editor of the journal Operations Research. He has also served on a number of university, corporate and government boards and councils.

Professor Magnanti has received numerous educational and research awards including four honorary degrees. He is a member of the U.S. National Academy of Engineering and the American Academy of Arts and Sciences. He has an undergraduate degree in Chemical Engineering from Syracuse University, and masters' degrees in Statistics and in Mathematics as well as a Ph.D. in Operations Research, all from Stanford University.

ORAL PRESENTATION

1. Determine Your Audio-Visual Needs

Each meeting room comes equipped with a computer, LCD projector and screen. The computers will be configured with Windows Operating System as well as with Microsoft Office and Adobe Acrobat Reader. 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). Please refer to the Final Program for actual presentation schedules. You are kindly requested to be at the presentation room at least 15 minutes before the session starts.

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.

Please discuss the same material as reported in your paper submission. 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 Jamaica Room, Level 10. 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

Thursday – 11 December 2014	
Poster Viewing	from 10:30 to 11:00 and 15:00 to 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. IEEM2014 will not be responsible for posters and materials left on poster boards after the end of the session.

Session Schedules

Decision Analysis & Methods I

10/12/2014 13:30 - 15:00
Room: Casablanca

Chairs: Shin-Guang Chen
Shino Iwami

Abstracts: see page 27

Simultaneous Consideration of Remanufactured and New Products in Optimal Product Line Design
Ridvan Aydin, C.K. Kwong, Ping Ji
The Hong Kong Polytechnic University, Hong Kong SAR

The Optimal Ordering Quantity with Uncertain Food's Safety Environment
Shu-Yen Hsu, Tyrone T. Lin
National Dong Hwa University, Taiwan

Reduced Recursive Inclusion-exclusion Principle for the Probability of Union Events
Shin-Guang Chen
Tungnan University, Taiwan

A Bi-level Algorithm for Product Line Design and Pricing
Shuli Wu, Songlin Chen
Nanyang Technological University, Singapore

An Optimal Electricity Consumption Decision with a Limited Carbon Emission Concept
Tyrone T. Lin, Hui-Chen Lan
National Dong Hwa University, Taiwan

An Integrated Data Envelopment Analysis (DEA) and Hedge Accounting Approach for Risk Management Efficiency Measurement: Evidence From Derivative Market in Asia-pacific Banks
Shahsuzan Zakaria, Sardar M. N. Islam
Victoria University, Australia

Decision Analysis & Methods II

10/12/2014 15:30 - 17:00
Room: Casablanca

Chairs: Yves De Smet
Saku Mäkinen

Abstracts: see page 28

A Fuzzy Linguistic Representation Model for Decision Making Under Uncertainty
Wen-Tao Guo, Van-Nam Huynh
Japan Advanced Institute of Science and Technology, Japan

Post Optimality Analysis of Pareto Optimal Set Through Weights Robustness
Maria Kalinina, David Sundgren
Stockholm University, Sweden

Adapting the ISO31000:2009 Enterprise Risk Management Framework Using the Six Sigma Approach
Bennie Seck-Yong Choo, Jenson Chong-Leng Goh
SIM University, Singapore

A Framework to Identify Sustainability Indicators for Product Design
Sam Yeon Kim[1], Seung Ki Moon[1], Hyung Sool Oh[2], Taezoon Park[3], HaeJin Choi[4], Hungsun Son[5]
[1]*Nanyang Technological University, Singapore*
[2]*Kangwon National University, South Korea*
[3]*Soongsil University, South Korea*
[4]*Chung-Ang University, South Korea*
[5]*Ulsan National Institute of Science & Technology, South Korea*

An Interactive Bi-criteria Heuristic Algorithm for the Coherent System Assembly
Abdel-Aziz M. Mohamed
Arab Academy for Science, Technology, and Maritime Transport, Egypt

Optimal Trial Number for D-optimal Designs Based on Efficiency-cost Ratio Analysis
XiuTing Liu, Sen Lin, Jun Yang
Beihang University, China

Swarm Based Mean-variance Mapping Optimization (MVMO^s) for Economic Dispatch Problem with Valve - Point Effects
Khoa Truong [1], Pandian Vasant[1], Balbir Singh Mahinder Singh[1], Dieu Vo[2]
[1]*Universiti Teknologi Petronas, Malaysia*
[2]*HCMC University of Technology, Viet Nam*

Operations Research I

10/12/2014 13:30 - 15:00
Room: Caymans 1

Chairs: Yuliang Su
Earl-Juei Wang

Abstracts: see page 29

A Multicriteria Decision Model for Technology Readiness Assessment for Energy Based on PROMETHEE Method with Surrogate Weights
Adiel Almeida[1], Danielle C Morais[1], Luciana Alencar[1], Tharcylla Clemente[1], Eduardo Krym[1], C. Z. Barboza[2]
[1]*Federal University of Pernambuco, Brazil*
[2]*2CGEE Centro de Gestão e Estudos Estratégicos, Brazil*

An Imperialist Competitive Algorithm for the Job Shop Scheduling Problems
Hamed Piroozfard, Kuan Yew Wong
Universiti Teknologi Malaysia, Malaysia

Impact Evaluation of MGNREGA Using Data Envelopment Analysis
Devaraj Hanumappa, Parthasarathy Ramachandran, T. G. Sitharam
Indian Institute of Science, India

Critical Literature Review on Maturity Models for Business Process Excellence
Saja Albliwi, Jiju Antony, Norin Arshed
Heriot-Watt University, United Kingdom

A Modified Genetic Algorithm for Precedence Constrained Operation Sequencing Problem in Process Planning
Yuliang Su, Xuening Chu, Dongping Chen, Dexin Chu
Shanghai Jiao Tong University, China

Building Master Surgery Schedules with Leveled Bed Occupancy and Nurse Workloads
Zakaria Abdelrasol[1], Nermine Harraz[2], Amr B. Eltawil[3]
[1]*Egypt-Japan University of Science and Technology (E-JUST), Egypt*
[2]*Alexandria University, Egypt*
[3]*Egypt - Japan University of Science and Technology (E-JUST), Egypt*

Operations Research II

10/12/2014 15:30 - 17:00
Room: Caymans 1

Chairs: Amr Eltawil
Shinji Inoue

Abstracts: see page 30

Resolution of Resource Conflicts in the CCPM Framework Using a Local Search Method
Hiroki Koga, Hiroyuki Goto, Eishi Chiba
Hosei University, Japan

A Heuristic Algorithm for the Prize Collecting Steiner Tree Problem
Yuki Hosokawa, Eishi Chiba
Hosei University, Japan

3D Loading Problem Formulation Using Mixed Integer Nonlinear Programming
Mojahid Saeed Osman[1], Bala Ram[2]
[1]*King Fahd University of Pertoleum & Minerals, Saudi Arabia*
[2]*North Carolina A&T State University, United States*

A Hybrid PSO-TS Approach for Proportionate Multiprocessor Open Shop Scheduling
Tamer Abdelmaguid
Cairo University, Egypt

An Improved Approach for the Quay Crane Assignment Problem with Limited Availability of Internal Trucks in Container Terminal
A. Karam[1], Amr B. Eltawil[1], Nermine Harraz[2]
[1]*Egypt - Japan University of Science and Technology (E-JUST), Egypt*
[2]*Alexandria University, Egypt*

Asset Integrity of Deepwater Petroleum Production Facilities
Mayang Kusumawardhani, Tore Markeset
University of Stavanger, Norway

Standardization Programs in the Industrial Plant Business: Best Practices and Lessons Learned
Michael Gepp, Jan Vollmar, Thomas Schaeffler
Siemens AG, Germany

Quality Control & Management I

10/12/2014 13:30 - 15:00
Room: Caymans 2

Chairs: Imad Alsyouf
Yoshinobu Tamura

Abstracts: see page 31

Modeling Autocorrelated Process Control with Industrial Application
Siaw Li Lee[1], Maman Abdurachman Djauhari[2], Ismail Mohamad[1]
[1]*Universiti Teknologi Malaysia, Malaysia*
[2]*Universitas Pasundan, Indonesia*

Estimation of Population Generalized Variance: Application in Service Industry
Revathi Sagadavan[1], Maman Abdurachman Djauhari[2], Ismail Mohamad[1]
[1]*Universiti Teknologi Malaysia, Malaysia*
[2]*Universitas Pasundan, Indonesia*

Factors Affecting Quality in a Manufacturing Environment for a Non-repairable Product
Rene Lombard, Corro van Waveren, Kai-Ying Chan
University of Pretoria, South Africa

Improving Quality of Operations via Industry-specific Empowerment Antecedents: A Study of the Oil and Gas Industry
Ngozi Onyemeh, Chan Wai Lee
University of Nottingham, Malaysia

Application of Six Sigma in Oil and Gas Industry: Converting Operation Data into Business Value for Process Prediction and Quality Control
Wai Kit Cheng[1], Amir Farid Azman[1], Mohamad Hisham Hamdan[2], Rachel Fran Mansa[3]
[1]*PETRONAS Penapisan (Terengganu) Sdn. Bhd., Malaysia*
[2]*PETRONAS Group Operation Excellence, Malaysia*
[3]*Universiti Malaysia Sabah, Malaysia*

Mishandled Baggage Problem: Causes and Improvement Suggestions
Imad Alsyouf, Fatima Humaid, Shaima Al Kamali
University of Sharjah, United Arab Emirates

Service Innovation & Management I

10/12/2014 15:30 - 17:00
Room: Caymans 2

Chairs: Vipul Jain
Chien-Liang Kuo

Abstracts: see page 32

Priority Investment Components of Emotional Intelligence Effective on Marketing with AHP Method
Parissa Tavakoli-Targhi, Yousef Gholipour Kanani
Islamic Azad University, Iran

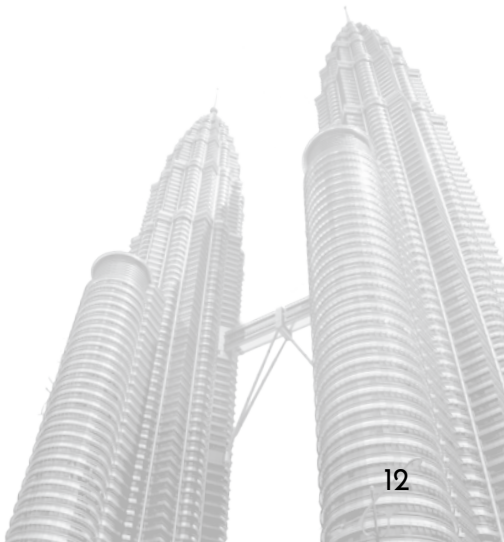
Workforce Planning for Global Network Delivery Model
Sumit Raut, Kishore Padmanabhan, Muralidharan Somasundhanram, Natarajan Vijayarangan
Tata Consultancy Services Limited, India

CSF in Product Innovation Process: A Comparative Study of Three Malaysian Manufacturing SMEs
Noor Hidayah Abu[1], Baba Md Deros[2], Mohd Fitri Mansor[3]
[1]*Universiti Utara Malaysia, Malaysia*
[2]*Universiti Kebangsaan Malaysia, Malaysia*
[3]*Universiti Malaysia Perlis, Malaysia*

Supporting the Cross-disciplinary Development of Product-service Systems Through Model Transformations
Thomas Wolfenstetter, Konstantin Kernschmidt, Christopher Münzberg, Daniel Kammerl, Suparna Goswami, Udo Lindemann, Birgit Vogel-Heuser, Helmut Krcmar
Technische Universität München, Germany

Structural Investigation of a Healthcare Value Chain: A Social Network Analysis Approach
Vipul Jain[1], Sumit Sakhuja[2]
[1]*University of Sharjah, United Arab Emirates*
[2]*Indian Institute of Technology Delhi, India*

Investigating the Effects of Project Scales on the Patterns and Performance of Successfully Funded, Technology-oriented Innovative Crowdfunding Projects
Chien-Liang Kuo[1], C.J.H. Lin[2], S.X.S. Huang[2], Yu-Chen Lin[1]
[1]*Chinese Culture University, Taiwan*
[2]*Ming-Jiang University, China*



Supply Chain Management I

10/12/2014 13:30 - 15:00
Room: Caymans 3

Chairs: R. Kant
Roger Jiao

Abstracts: see page 33

Supplier Selection Activities in the Service Sector: A Case Study in Nigeria
Dotun Adebanjo[1], Matthew Tickle[2], Frank Ojadi[3], Petros Ieromonachou[1], Tritos Laosirihongthong[4], Roula Michaelides[2]
[1]*University of Greenwich, United Kingdom*
[2]*University of Liverpool, United Kingdom*
[3]*University of Lagos, Nigeria*
[4]*Thammasat University, Thailand*

Managing Supply Disruption in a Three-tier Supply Chain with Multiple Suppliers and Retailers
Sanjoy Kumar Paul, Ruhul Sarker, Daryl Essam
University of New South Wales, Australia

Collaborative Inventory Distribution Management in a Supply Chain: A Simulation Perspective
Joby George, Nimmy J.S., V. Madhusudanan Pillai
National Institute of Technology Calicut, India

In-house Capacity Investment and Outsourcing Under Competition
Tarun Jain, Jishnu Hazra
Indian Institute of Management, India

Optimization of Multi-commodities Consumer Supply Chains Part II: Simulation Modeling
Zeinab Haji Hajiabolhasani, Romeo M. Marian, Lee Luong
University of South Australia, Australia

Identifying Critical Success Factors for Green Supply Chain Management Implementation Using Fuzzy DEMATEL Method
Rakesh Kumar Malviya, Ravi Kant
Sardar Vallabhbhai National Institute of Technology, India

Warehouse Storage Assignment: The Case Study of a Plastic Bag Manufacturer
Chompoonoot Kasemset, J. Sudphan
Chiang Mai University, Thailand

Manufacturing Systems I

10/12/2014 15:30 - 17:00
Room: Caymans 3

Chairs: Rob Dekkers
Kanagi Kanapathy

Abstracts: see page 34

Comparing Malaysian and Scottish Firms on Practices for Strategic Capability Management
Rob Dekkers[1], Kanagi Kanapathy[2]
[1]*University of Glasgow, United Kingdom*
[2]*University of Malaya, Malaysia*

The Moderation Effect of the Cultural Dimension "Individualism/Collectivism" on Toyota Way Deployment - A Global Study on Toyota Facilities
Nihal Jayamaha[1], Jurgen Wagner[2], Nigel Grigg[1]
[1]*Massey University, New Zealand*
[2]*Robert Bosch GmbH, Germany*

Assessment of the Teamwork Organization in a Production Plant of a Major German Automobile Manufacturer
Robert Stranzenbach, Philipp M. Przybysz, Susanne Mütze-Niewöhner, Stephan Scheel, Christopher M. Schlick
RWTH Aachen University, Germany

Modeling Cognitive Network of a Physical System Using Design Knowledge Base
Shah Limon[1], Om Prakash Yadav[1], Bimal Nepal[2]
[1]*North Dakota State University, United States*
[2]*Texas A & M University, United States*

Theoretical considerations for Make-or-buy Decisions During 'Product Design and Engineering': Three Indian Case Studies
Rob Dekkers
University of Glasgow, United Kingdom

Lean Transformation Efforts of the Wood Industry in Virginia
Omar Espinoza[1], Urs Buehlmann[2], C Fricke[3]
[1]*University of Minnesota, United States*
[2]*Virginia Tech, United States*
[3]*Kollmorgen, United States*

Optimal Control Synthesis for a Flexible Manufacturing System Based on Minimal Cuts
Sadok Rezig, Zied Achour, Nidhal Rezg, Mohamed-Ali Kammoun
University of Lorraine, France

Technology & Knowledge Management I

10/12/2014 13:30 - 15:00
Room: Caymans 4

Chairs: Atsushi Aoyama
Ching Chieh Kiu

Abstracts: see page 35

A Behavioral Loyalty Model of Portable Computers
Mohammad Reza Shahriari[1], Ali Hajiha[1], Sara Dehghan[2]
[1]*Islamic Azad University, United Arab Emirates*
[2]*Islamic Azad University, Iran*

Regionalization of Engineering - Framework and Scenarios
Thomas Schaeffler[1], Rudolf Kodes[1], Michael Gepp[1], Nadja Hoßbach[2], Arndt Lüder[3]
[1]*Siemens AG, Germany*
[2]*Friedrich-Alexander-University Erlangen-Nuremberg, Germany*
[3]*Otto-von-Guericke University, Germany*

The Marketing Strategy for Successful Product Development Performance in Iranian Nanotechnology-based Enterprises
Naser Khosravi, Mohsen Sadeghi
Amirkabir University of Technology, Iran

Forecasting of Diffusion Pattern: A Case Example of OLED Technology
Pawat Tansurat, Nathasit Gerdsri
Mahidol University, Thailand

Improving Management Practices Upon Organizational Characteristics - An Analysis of Japanese Manufacturing Subsidiaries in Vietnam
Nguyen Thi Duc Nguyen, Atsushi Aoyama
Ritsumeikan University, Japan

Identifying Knowledge Components in Software Requirement Elicitation
Laleh Taheri, Noraini Che Pa, Rusli Abdullah, Salfarina Abdullah, Mohammad Yaser Shafazand
University Putra Malaysia, Malaysia

Information Processing & Engineering I

10/12/2014 15:30 - 17:00
Room: Caymans 4

Chairs: Md. Mamun Habib
Olaf Sauer

Abstracts: see page 36

A Bayesian Accelerated Degradation Studies on Nitrile Rubber O-ring
Lizhi Wang, Xiaohong Wang, Yuxiang Li, Wenhui Fan
Beihang University, China

Interview Study: Decisions and Decision Criteria for Development in Industry
Danilo Marcello Schmidt[1], Sebastian Schenkl[2], Eduard Munkhart[2], Susanne Nilsson[3], Markus Mörtl[2]
[1]*Technical University of Munich, Germany*
[2]*Technische Universität München, Germany*
[3]*Royal Institute of Technology, KTH, Sweden*

Theoretical Analysis of RFID Security Protocols
Azam Zavvari, Mohammad Tariqul Islam, Masoud Shakiba, Mandeep Jit Singh
Universiti Kebangsaan Malaysia, Malaysia

Analyzing and Visualizing News Trends Over Time
Lubaba Farin Tanisha[1], Bishwajit Banik Pathik[2], Manzur H. Khan[1], Md. Mamun Habib[3]
[1]*American International University-Bangladesh (AIUB), Bangladesh*
[2]*American International University-Bangladesh, Bangladesh*
[3]*Universiti Utara Malaysia (UUM), Malaysia*

A Novel Tool for Reducing Time and Cost at Software Test Estimation: An Use Cases and Functions Based Approach
Shaiful Islam[1], Bishwajit Banik Pathik[1], Manzur H. Khan[1], Md. Mamun Habib[2]
[1]*American International University-Bangladesh, Bangladesh*
[2]*Universiti Utara Malaysia (UUM), Malaysia*

Self-focusing Appearance in Ultra-compact 3×3 Multimode Interference Coupler Based on Silicon on Insulator
Mehdi Tajaldini[1], Mohd Zubir Mat Jafri[2]
[1]*University Sains Malaysia, Malaysia*
[2]*Universiti Sains Malaysia, Malaysia*

Healthcare Systems & Management

10/12/2014 13:30 - 15:00
Room: Jamaica

Chairs: Juha Puustjärvi
Kai-Way Li

Abstracts: see page 37

Healthcare Platforming for Healthcare Service Development in Hospitals
Linda L. Zhang[1], Michel Aldanondo[2], Arun Kumar[3]
[1]*IESEG School of Management (LEM-CNRS), France*
[2]*Toulouse University-Mines Albi, France*
[3]*RMIT University, Australia*

Design of a Dynamic Bi-objective Relief Routing Network in the Earthquake Response Phase
Shadab Shishehgar[1], Reza Tavakkoli-Moghaddam[1], Ali Siadat[2], Mehrdad Mohammadi[1]
[1]*University of Tehran, Iran*
[2]*Arts et Métier Paris Tech, France*

Towards an Instrumented Tissue Expander
Annette Böhmer[1], Alexander Zöllner[2], Ellen Kuhl[2], Udo Lindemann[1]
[1]*Technische Universität München, Germany*
[2]*Stanford University, United States*

Health System Design: A Financial Perspective
Hans-Jakob Luethi, C. Mandl, Philippe Widmer
ETH Zurich, Switzerland

An Employee Assistance Program by Analyzing the Correlation Between Work Stress and Dreams for Chinese Employees
Kuei-Chen Chiu[1], Tsai-Wei Huang[2], Shulan Hsieh[1]
[1]*National Cheng Kung University, Taiwan*
[2]*National Chiayi University, Taiwan*

A Novel Simulated Metamorphosis Algorithm for Homecare Nurse Scheduling
Michael Mutingi[1], Charles Mbohwa[2]
[1]*Namibia University of Science & Technology, Namibia*
[2]*University of Johannesburg, South Africa*

Education Management in Healthcare Communities
Juha Puustjärvi[1], Leena Puustjärvi[2]
[1]*University of Helsinki, Finland*
[2]*The Pharmacy of Kaivopuisto, Finland*

Intelligent Systems I

10/12/2014 15:30 - 17:00
Room: Jamaica

Chairs: Gamini Wijayarathna
Dianne Lee-Mei Cheong

Abstracts: see page 38

Study on the Production Forecasting Based on Grey Neural Network Model in Automotive Industry
Bin Lin, Seng Fat Wong, Weng Ian Ho
University of Macau, Macau

The Need for Integrating Statistical Process Control and Automatic Process Control
Abdul-Wahid A. Saif
King Fahd University of Petroleum & Minerals, Saudi Arabia

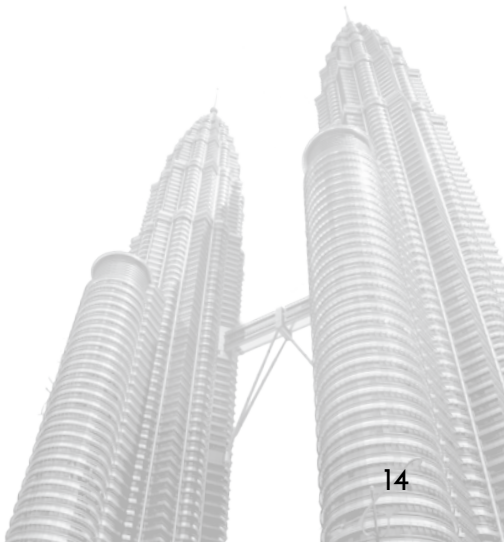
Modeling Novices in Decision-problem Structuring for Collective Intelligence
Dianne Lee-Mei Cheong
Universiti Teknologi MARA, Malaysia

Survey on Tools and Systems to Generate ER Diagram from System Requirement Specification
Wasana C. Uduwela, Gamini Wijayarathna
University of Kelaniya, Sri Lanka

A Methodology for Fuzzy Multi-criteria Decision-making Approach for Scheduling Problems in Robotic Flexible Assembly Cells
Khalid Abd, Kazem Abhary, Romeo M. Marian
University of South Australia, Australia

Application of a Fuzzy Multi-criteria Decision-making Approach for Dynamic Scheduling in Robotic Flexible Assembly Cells
Khalid Abd, Kazem Abhary, Romeo M. Marian
University of South Australia, Australia

Overtime Capacity Expansion in Order Acceptance with Node Based Estimation of Distribution Algorithms
Watcharee Wattanapornprom[1], Tieke Li[1], Warin Wattanapornprom[2], Prabhas Chongstitvatana[2]
[1]*University of Science and Technology Beijing, China*
[2]*Chulalongkorn University, Thailand*



Systems Modeling & Simulation I

10/12/2014 13:30 - 15:00
Room: Kaywest

Chairs: Norani Nordin
Kiyoshi Sawada

Abstracts: see page 39

Dynamic Modeling and Analysis of LM6000 Gas-turbine Synchronous Generator
Roozbeh Eshraghnia, Randy J. Kleen
General Electric, Power & Water, United States

Simulation Based Lean Six Sigma Approach to Reduce Patients Waiting Time in an Outpatient Eye Clinic
Weidong Lin[1], Xianfei Jin[2], Sie Yong Chia[1]
[1]*Temasek Polytechnic, Singapore*
[2]*Integrated Decision Systems Consultancy, Singapore*

Combining Set-based Concurrent Engineering and Function- Means Modelling to Manage Platform-based Product Family Design
Dag Raudberget, Marcel Michaelis, Hans Johannesson
Chalmers University of Technology, Sweden

Simulation of New System Departure Terminal Soekarno-Hatta International Airport
Dimas Novrisal[1], Nuraida Wahyuni[2], Nadia Hamani[3], Abderrahman Elmhamedi[4], Tresna Soemardi[5]
[1]*Université de Paris 8, France*
[2]*University of Sultan Ageng Tirtayasa, Indonesia*
[3]*Université de Picardie Jules Verne, France*
[4]*Paris 8 University, France*
[5]*University of Indonesia, Indonesia*

Numerical Simulation of Stress Distribution of a Femur-Menisci-Tibia Bone During Normal Standing, Normal Walking, and Standing with a Cane
Angkhana Prommarat[1], Athassawat Kammanee[2], Thitikom Puapansawat[1], Farida Chamchod[1]
[1]*Mahidol University, Thailand*
[2]*Prince of Songkla University , Thailand*

Statistical Analysis and a Social Network Model Based on the SEIQR Framework
Benjamas Chimmalee, Wannika Sawangthong, Rawee Suwandechochai, Farida Chamchod
Mahidol University, Thailand

Placing a Liaison with Long Communication Lengths to the Same Level in an Organization Structure
Kiyoshi Sawada
University of Marketing and Distribution Sciences, Japan

Project Management I

10/12/2014 15:30 - 17:00
Room: Kaywest

Chairs: Linda Zhang
Ramanathan Chidambaram

Abstracts: see page 40

Setting Up An Intellectual Properties Intermediary Service: DMAIC Way
Kim Siow
Universiti Kebangsaan Malaysia, Malaysia

Modular, Building Blocks - Based Approach for Information and Documentation Management in Planning Projects
Daniel Oehme, Ralph Riedel, Egon Müller
Technische Universität Chemnitz, Germany

Establishing the Development Mechanism of ERP Report
Te- King Chien, Hou-Yi Lin
National Formosa University, Taiwan

Multi-objective Optimization and Risk Assessment in System Engineering Project Planning by Ant Colony Algorithm
Pablo Baroso, Thierry Coudert, Eric Villeneuve, Laurent Geneste
University of Toulouse, France

Analyzing Implementation of Lean Production Control with the Viable System Model
Fatos Elezi[1], Michael Timo Schmidt[1], Iris Tommelein[2], Udo Lindemann[1]
[1]*Technische Universität München, Germany*
[2]*University of California, United States*

Development of QuicKaizen^TM Technique for Productivity Execution Management for Singapore SMEs
Chin Wei Gan, Ming Hon Toh, Roland Lim, Bin Ma, Puay Siew Tan, Amrik Singh Bhullar
Singapore Institute of Manufacturing Technology, Singapore

The Resource-constrained Project Scheduling Problem with Stochastic Activity Durations
Stefan Creemers
IESEG Management School, France

A Comparative Study Among Stakeholders on Causes of Time Delay in Malaysian Multiple Design and Build Projects
Ramanathan Chidambaram[1], Narayanan Sambu Potty[2]
[1]*Kumpulan Liziz Sdn. Bhd., Malaysia*
[2]*Universiti Teknologi Petronas, Malaysia*

Human Factors I

10/12/2014 13:30 - 15:00
Room: Cancun

Chairs: Peter Kuhlang
Myung Hwan Yun

Abstracts: see page 41

Enhancing Work System Design and Improvement by Further Developments of Value Stream Mapping
Peter Kuhlang[1], Thomas Edtmayr[2], Alexander Sunk[2], Thomas Mühlbradt[1]
[1]*MTM-Institute, German MTM-Association, Germany*
[2]*Vienna University of Technology, Austria*

Influence of Human Factors Over Idea Generation: a Qualitative and Quantitative Analysis of an Enterprise of the Graphic Sector in Medellin
Manuela Escobar Sierra, Luz Dinora Vera Acevedo
Universidad Nacional de Colombia, Colombia

The Effect of Font Size on Typing Performance and Sitting Posture
Haruetai Lohasiriwat, Temsin Wattanapanich, Panmeq Saechan
Chulalongkorn University, Thailand

Improvement of Workstation by Providing Ergonomically Designed Chair and Table for the Water Hyacinth Weaving Department of the Villar Foundation
Devie Ann Gamata, Ralph Orozco, J K. C. Laserna, J. A. Medina, Sheily Mendoza, R J. U. Garcia
University of Perpetual Help System DALTA, Philippines

The Effect of Psychosocial Stress on Trapezius Muscle Activity During Computer Work: A Review
Mohd Firdaus Mohd Taib, Myung Hwan Yun
Seoul National University, South Korea

Parametric Modeling of 3D Human Faces Using Anthropometric Data
Chun-Yang Tseng, I-Jan Wang, Chih-Hsing Chu
National Tsing Hua University, Taiwan

Developing Transfer of Learning Through Reflective Framing and Design Thinking: An Engineering-games Design Approach
Chien-Sing Lee[1], K. Daniel Wong[2]
[1]*Universiti Tunku Abdul Rahman, Malaysia*
[2]*Malaysia University of Science and Technology, Malaysia*

Production Planning & Control I

10/12/2014 15:30 - 17:00
Room: Cancun

Chairs: Philipp Baumann
Norbert Trautmann

Abstracts: see page 42

Process Family Planning: An Optimization-based Approach
Roel Leus[1], Linda L. Zhang[2], Daniel Kowalczyk[1]
[1]*KU Leuven, Belgium*
[2]*IESEG School of Management (LEM-CNRS), France*

Efficient Symmetry-breaking Formulations for Grouping Customer Orders in a Printing Shop
Philipp Baumann, Norbert Trautmann
University of Bern, Switzerland

Continuous Precise Workload Control Method
Hakan Akillioglu, Joao-Dias Ferreira, Antonio Maffei, Pedro Neves, Mauro Onori
Royal Institute of Technology, Sweden

Economic Level of Detail for Assembly Planning
Achim Kampker, Peter Burggräf, Yvonne Bäumers
RWTH Aachen University, Germany

Scheduling a Dynamic Flowshop to Minimize the Mean Absolute Deviation from Distinct Due Dates
Ahmed W. El-Bouri
Sultan Qaboos University, Oman

A Hybrid EOQ and Fuzzy Model to Minimize the Material Inventory in Ready Mixed Concrete Plants
Mehdi Ravanshadnia, Milad Ghanbari
Islamic Azad University, Iran

A Structural Equation Model Linking Forecasting, Planning and Controlling with SME Performance
Biju Puthanveettil[1], Bhasi Marath[2]
[1]*Rajiv Gandhi Institute of Technology, India*
[2]*Cochin University of Science and Technology, India*

Decision Analysis & Methods III

11/12/2014 11:00 - 12:30
Room: Casablanca

Chairs: Rajasvaran Logeswaran
Elita Amrina

Abstracts: see page 43

Design for Open Innovation (DfOI) - Product Structure Planning for Open Innovation Toolkits
Maik Holle, Udo Lindemann
Technische Universitaet Muenchen, Germany

Effects of Different Classifiers in Detecting Infectious Regions in Chest Radiographs
Wan Siti Halimatul Munirah Wan Ahmad[1], Rajasvaran Logeswaran[2], Mohammad Faizal Ahmad Fauzi[1], Wan Mimi Diyana Wan Zaki[3]
[1]*Multimedia University, Malaysia*
[2]*Nilai University, Malaysia*
[3]*Universiti Kebangsaan Malaysia, Malaysia*

Parallelization of Industrial Process Control Program Based on the Technique of Differential Evolution Using Multi-threading
Rajeev Agrawal[1], Abhinav Goyal[1], Debjani Sambasivam[2], Arya K Bhattacharya[3]
[1]*Birla Institute of Technology, Mesra, India*
[2]*Tata Steel, India*
[3]*Mahindra Ecole Central, India*

Weibull Component Reliability Evaluation With Masked Data
Jieqiong Miao, Xiaogang Li, Renxi Luo
Beihang University, China

An Extension of PROMETHEE to Divisive Hierarchical Multicriteria Clustering
Yves De Smet
Université libre de Bruxelles, Belgium

Effectiveness Assessment for Waste Management Decision-support in the Arctic Drilling
Yonas Zewdu Ayele, Abbas Barabadi, Javad Barabady
The University of Tromsø - The Arctic University of Norway, Norway

Decision Analysis & Methods IV

11/12/2014 13:30 - 15:00
Room: Casablanca

Chairs: Rudra P Pradhan
Hossam Ismail

Abstracts: see page 44

Real-time Decision Support System for Resource Optimization & Management of Threat Evaluation and Weapon Assignment Engineering in Air Defence
Afshan Naseem, Shoab Ahmed Khan, Asad Waqar Malik
National University of Sciences & Technology, Pakistan

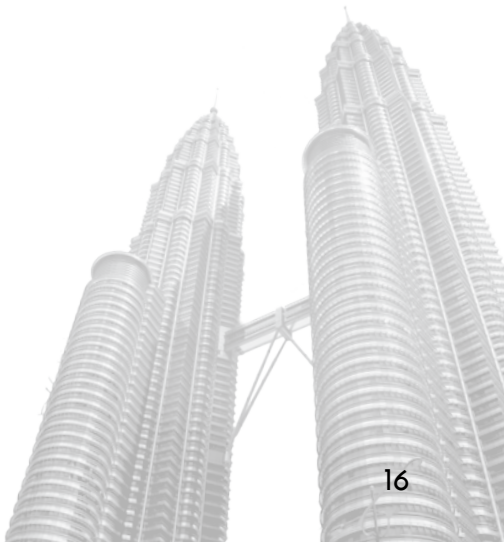
An Approach to Analyse Key Renewable Energy Technologies: A Case from Sri Lanka
Amila Withanaarachchi, Julian Nanayakkara, Chamli Pushpakumara
University of Kelaniya, Sri Lanka

Bibliometric Methodology to Detect Collaborative and Competitive Countries
Shino Iwami[1], Francisco Tacoa[1], Junichiro Mori[1], Yuya Kajikawa[2], Ichiro Sakata[1]
[1]*The University of Tokyo, Japan*
[2]*Tokyo Institute of Technology, Japan*

Fuzzy Decision Making in Shape Feature Design for Product Development
Ching-Hu Yang[1], Chung-Shing Wang[1], Chin-Fu Chen[1], P.Y. Lin[1], Chung-Chuan Wang[2]
[1]*Tung-Hai University, Taiwan*
[2]*Chung-Chou University of Science and Technology, Taiwan*

An ANP-based Multi Criteria Decision Making Model for Supplier Selection
Hisham Alidrisi
King Abdulaziz University, Saudi Arabia

Multi-granules Evaluation Model Through Fuzzy Random Regression Analysis
Nureize Arbaiy
University Tun Hussein Onn Malaysia, Malaysia



Decision Analysis & Methods V

11/12/2014 15:30 - 17:00
Room: Casablanca

Chairs: Ali Siadat
Abdel-Aziz M. Mohamed

Abstracts: see page 45

A Case Study on Mining Social Media Data
Hing Kai Chan[1], Ewelina Lacka[2], Rachel W. Y. Yee[3], Ming K. Lim[4]
[1]*University of Nottingham China, China*
[2]*University of Strathclyde, United Kingdom*
[3]*Hong Kong Polytechnic University, Hong Kong SAR*
[4]*University of Derby, United Kingdom*

Understanding Sustainability in Healthcare Systems: A Systems Thinking Perspective
Michael Mutingi[1], Charles Mbohwa[2]
[1]*Namibia University of Science & Technology, Namibia*
[2]*University of Johannesburg, South Africa*

Mitigating the Effort for Engineering Changes in Product Development Using a Fuzzy Expert System
Tobias Kindsmüller, Florian G. H Behncke, Benjamin Stahl, Klaus Diepold, Martina Wickel, Daniel Kammerl, Konstantin Kernschmidt
Technische Universität München, Germany

Information Communications Technology (ICT) Infrastructure Impact on Stock Market-Growth Nexus: The Panel VAR Model
Rudra P Pradhan
Indian Institute of Technology Kharagpur, India

A Mathematical Formulation for Low Carbon Electricity Planning in the Presence of Technology and Policy Interventions
Amrutha Appiyah, Muthu Mathirajan, Balachandra Patil
Indian Institute of Science, India

Five Factors That Make Pervasive Business Intelligence a Winning Wager
Riccardo Cognini, Flavio Corradini, Alberto Polzonetti, Barbara Re
University of Camerino, Italy

A New Hesitant Fuzzy Analytical Hierarchy Process Method for Decision-making Problems Under Uncertainty
S. M. Mousavi[1], Hossein Gitinavard[2], Ali Siadat[3]
[1]*Shahed University, Iran*
[2]*Iran University of Science and Technology, Iran*
[3]*Arts et Métier Paris Tech, France*

Operations Research III

11/12/2014 09:00 - 10:30
Room: Caymans 1

Chairs: Konstantinos Kirytopoulos
Shieu-Hong Lin

Abstracts: see page 46

A New DEA Model for Six Sigma Project Selecting: Case Study on Esfahan Province Electricity Distribution Co (EPEDC)
Ali Yousefi, Amir Reza Aqamohammadi
Esfahan Province Electricity Distribution Company, Iran

Vehicle Routing Problem for Hazardous Materials Transportation: An Overview.
Khaoula Hamdi[1], Nacima Labadie[2], Alice Yalaoui[2]
[1]*King Saud University, Saudi Arabia*
[2]*University of Technology of Troyes, France*

Electricity System Sustainability Transitions : An Integrated Methodology
Tarun Sharma, Patil Balachandra
Indian Institute of Science, India

Multi-project Flexible Resource Profiles Project Scheduling with Ant Colony Optimization
Elena Rokou[1], Manos Dermitzakis[1], Konstantinos Kirytopoulos[2]
[1]*National Technical University of Athens, Greece*
[2]*University of South Australia, Australia*

An Efficient Solution Framework for a Large Scale Delivery Problem
Suyan Teng[1], Edmund Chan[1], Changjun Yang[1], Mingyen Yu[1], Siow Hwei Tan[2]
[1]*Republic Polytechnic, Singapore*
[2]*ST Logistics Pte. Ltd, Singapore*

Second Order-response Surface Model for the Automated Parameter Tuning Problem
Aldy Gunawan, Hoong Chuin Lau
Singapore Management University, Singapore

Operations Research IV

11/12/2014 11:00 - 12:30
Room: Caymans 1

Chairs: Tatsushi Nishi
Sha'ri Mohd Yusof

Abstracts: see page 47

A Bootstrap Data Envelopment Analysis (BDEA) Approach in Islamic Banking Sector: A Method to Strengthen Efficiency Measurement
Shahsuzan Zakaria[1], Mad Ithnin Salleh[2], Shamsuriati Hasan[3]
[1]*Victoria University, Australia*
[2]*Sultan Idris Education University, Malaysia*
[3]*A.Z.E Groups, Malaysia*

A Rule-based Heuristic Procedure for the Container Pre-marshalling Problem
Mohamed Gheith[1], Amr B. Eltawil[2], Nermine Harraz[3]
[1]*Egypt-Japan University of Science and Technology, Egypt*
[2]*Egypt - Japan University of Science and Technology (E-JUST), Egypt*
[3]*Alexandria University, Egypt*

Operational Excellence Frameworks - Case Studies and Applicability to SMEs in Singapore
Amrik Singh Bhullar, Chin Wei Gan, Andy Ang, Bin Ma, Roland Lim, Ming Hon Toh
Singapore Institute of Manufacturing Technology, Singapore

A Mathematical Model and a GRASP Metaheuristic for a Faculty-course Assignment Problem for a University in Saudi Arabia
Khaoula Hamdi
King Saud University, Saudi Arabia

Multi-objective Vehicle Refueling Planning Using Mixed Integer Programming
Shieu-Hong Lin
Biola University, United States

Solving the Toll Optimization Problem by a Heuristic Algorithm Based Upon Sensitivity Analysis
Vyacheslav Kalashnikov[1], Nataliya Kalashnykova[2], Roberto Carlos Herrera-Maldonado[1]
[1]*Tecnológico de Monterrey (ITESM), Mexico*
[2]*Autonomous University of Nuevo León, Mexico*

Global Manufacturing & Engineering

11/12/2014 13:30 - 15:00
Room: Caymans 1

Chairs: Xun Xu
Roger Jiao

Abstracts: see page 48

Drivers and Barriers in Sustainable Manufacturing Implementation in Malaysian Manufacturing Firms
Norani Nordin, Hasbullah Ashari, Mohamad Ghozali Hassan
Universiti Utara Malaysia, Malaysia

Choose Whom to Date Wisely: Explaining the Performance Variation in Strategic Alliances
Mait Rungi, Valeria Stulova
Tallinn University of Technology, Estonia

Smart Factories in Industry 4.0: A Review of the Concept and of Energy Management Approached in Production Based on the Internet of Things Paradigm
Fadi Shrouf[1], Joaquin Ordieres[2], Giovanni Miragliotta[1]
[1]*Politecnico di Milano, Italy*
[2]*Universidad Politécnica de Madrid, Spain*

Application of Lean Manufacturing in Mass Production System: A Case Study in Indian Manufacturing Unit
Mahadevan Kishore Kumar, A. John Rajan, R. Kaja Bantha Navas, S. Sahaya Rubinson
Sathyabama University, India

Simultaneous Configuration of Product Families and Supply Chains for Mass Customization Using Leader-follower Game Theory
Dong Yang[1], Roger J. Jiao[2]
[1]*Donghua University, China*
[2]*Georgia Institute of Technology, United States*

Operations Research V

11/12/2014 15:30 - 17:00
Room: Caymans 1

Chairs: Vyacheslav Kalashnikov
Stefan Creemers

Abstracts: see page 49

Management of the Care Activities in Home Health Care Services: the Routing and Scheduling of Caregivers Level
Rabeh Redjem[1], Eric Marcon[2], Xiaolan XIE[3]
[1]*Paris 8 University, France*
[2]*Saint Etienne University, France*
[3]*Ecole des mines de Saint Etienne, France*

Optimal Cost Drivers in Activity Based Costing Based on Artificial Neural Network
Noppadol Amdee[1], Kawin Sonthipermpoon[2], Thongchai Arunchai[3], Phanboonmee Warawut[4]
[1]*Muban Chombueng Rajabhat University, Thailand*
[2]*Naresuan University, Thailand*
[3]*Rajamangala University of Technology Suvarnabhumi, Thailand*
[4]*UK Engineering & Supply Co.,Ltd., Thailand*

Icing and Performance of Offshore Production Facilities in Cold Climate Region
Rezgar Zaki, Abbas Barabadi
The University of Tromsø - The Arctic University of Norway, Norway

Petri Net Representation for 0-1 Integer Programming Problems
Akito Kodama, Tatsushi Nishi
Osaka University, Japan

Algorithms for the Min-max Regret Generalized Assignment Problem with Interval Data
Wei Wu[1], Manuel Iori[2], Silvano Martello[3], Mutsunori Yagiura[1]
[1]*Nagoya University, Japan*
[2]*University of Modena and Reggio Emilia, Italy*
[3]*University of Bologna, Italy*

Network Optimization for Capturing and Transporting CO_2
Ho-Yoeng Yun[1], Lianxi Bai[1], Kyung-Sup Kim[1], Suk-Jae Jeong[2]
[1]*Yonsei University, South Korea*
[2]*Kwangwoon University, South Korea*

Laboratory Measurement: Chlorophyll-a Concentration Measurement with Acetone Method Using Spectrophotometer
Fairooz Johan, Mohd Zubir Mat Jafri, Hwee San Lim, Wan Maznah Wan Omar
Universiti Sains Malaysia, Malaysia

Quality Control & Management IV

11/12/2014 09:00 - 10:30
Room: Caymans 2

Chairs: David Tchoffa
Diego Tlapa

Abstracts: see page 50

Comparative Analysis of Taguchi's Crossed Array Approach vs Combined Array Approach to Robust Parameter Design: A Study Based on Apparel Industry
Pramila Gamage[1], Nihal Jayamaha[1], Nigel Grigg[1], Manjula Nanayakkara[2]
[1]*Massey University, New Zealand*
[2]*University of Peradeniya, Sri Lanka*

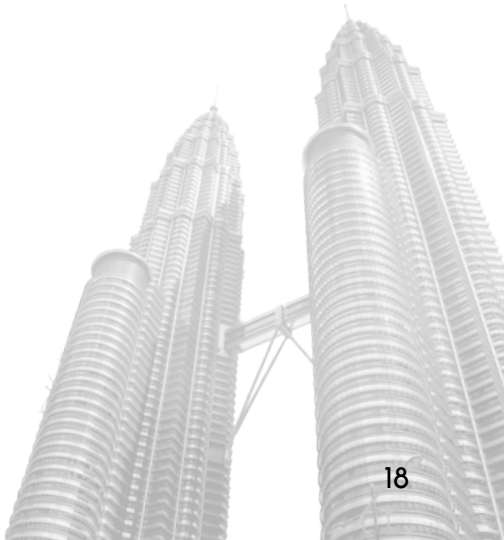
Total Quality Management in Product Life Cycle
Dinh Son Nguyen
Danang University of Science and Technology, The University of Danang, Viet Nam

Fuzzy Mean and Range Control Charts for Monitoring Fuzzy Quality Characteristics: A Case Study in Food Industries Using Chicken Nugget
S. Mojtaba Zabihinpour, M. K. A. Ariffin, S. H. Tang, A. S. Azfanizam, Omid Boyer
Universiti Putra Malaysia, Malaysia

One Hotelling T2 Chart Based on Transformed Data for Simultaneous Monitoring the Frequency and Magnitude of an Event
Yuan Cheng[1], Amitava Mukherjee[2]
[1]*City University of Hong Kong, Hong Kong SAR*
[2]*Indian Institute of Management Udaipur, India*

Quality Operating of Information Systems and Service Level Agreement
David Tchoffa[1], El Mouloudi Dafaoui[1], Abderrahman Elmhamedi[1], Luminita Duta[2]
[1]*Paris 8 University, France*
[2]*Valahia University, Romania*

Drilling Waste Minimization in the Barents Sea
Rezgar Zaki, Abbas Barabadi
The University of Tromsø - The Arctic University of Norway, Norway



Service Innovation & Management II

11/12/2014 11:00 - 12:30
Room: Caymans 2

Chairs: Carman Ka Man Lee
Ahmed Abdelgawad

Abstracts: see page 51

Influence of Task Characteristics on Team Performance
Philipp M. Przybysz, Sönke Duckwitz, Christopher M. Schlick
RWTH Aachen University, Germany

Multi-screen Services Adoption and Use-diffusion: The BEST Model Perspective
Hung Chih Lai, Yao Cheng Yu, Yi-Min Tuan, Hui Shan Kuo
iNSIGHT Center, National Taiwan University, Taiwan

Effects of the Electromobility on Rescue Service Provisions
Francoise Meyer, Alexander Rannacher, Sönke Duckwitz
RWTH Aachen University, Germany

TRIZ Based Approach to Improve Public Bus Service Quality
Christina Wirawan, Astrid Ayu
Maranatha Christian University, Indonesia

Design and Development Waste Management System in Hong Kong
Carman Ka Man Lee, Trevor Wu
The Hong Kong Polytechnic University, Hong Kong SAR

Maximizing Service Value: A Case Study of Online Hotel Reservation
Napaporn Rianthong[1], Aussadavut Dumrongsiri[1], Youji Kohda[2]
[1]*Thammasat University, Thailand*
[2]*Japan Advanced Institute of Science and Technology, Japan*

Quality Control & Management II

11/12/2014 13:30 - 15:00
Room: Caymans 2

Chairs: Dinh Son Nguyen
Sofiene Dellagi

Abstracts: see page 52

Driving 'Soft' Factors for Sustaining Quality Excellence: Perceptions from Quality Managers
Mehran Doulatabadi, Sha'ri Mohd Yusof
Universiti Teknologi Malaysia, Malaysia

Robust On-line Monitoring for Univariate Processes Based on Two Sample Goodness-of-fit Test
Chen Zhang, Nan Chen
National University of Singapore, Singapore

Critical Success Factors of Six Sigma: An Overview
Diego Tlapa[1], Jorge Limon[1], Yolanda Báez[1], Delia Valles-Rosales[2]
[1]*Autonomous University of Baja California, Mexico*
[2]*New Mexico State University, United States*

Human Values for Implementation of Total Quality Management: Proposed Conceptual Framework of an Automated Tool
Muhammad Noman Malik, Sha'ri Mohd Yusof
Universiti Teknologi Malaysia, Malaysia

Factors that Impact Project Quality at a Nuclear Power Plant in South Africa
Stanley Fore, W. Galetta
Cape Peninsula University of Technology, South Africa

Improving Overall Equipment Effectiveness (OEE) Through the Six Sigma Methodology in a Semiconductor Firm: A Case Study
Kam-Choi Ng[1], Kuan Eng Chong[2], Gerald Guan Gan Goh[3]
[1]*Infineon Technologies, Malaysia*
[2]*Technical University Malaysia, Malaysia*
[3]*Multimedia University, Malaysia*

Quality Control & Management III

11/12/2014 15:30 - 17:00
Room: Caymans 2

Chairs: Pei-Lee Teh
Kuan Eng Chong

Abstracts: see page 53

Optimal Integrated Maintenance Policy Based on Quality Deterioration
Meriem Kouki[1], Sofiene Dellagi[1], Zied Achour[1], Walid Erray[2]
[1]*University of Lorraine, France*
[2]*ArcelorMittal Maizières Research SA, France*

A Study on the Optimization of Wafer Pre-treatment Conditions for Thin Film Stability Monitor
Taicheng Kevin Gong, Yanju Lisa Yu, Yan Kaily Cao, Xueliang Ruben Zhang, Kaiyuan Kevin Chang, Weiting Kary Chien
Semiconductor Manufacturing International Corporation, China

Monitoring Correlation Structures Stability in Foreign Exchange Market
Siew Lee Gan[1], Maman Abdurachman Djauhari[2], Zuhaimy Ismail[1]
[1]*Universiti Teknologi Malaysia, Malaysia*
[2]*Universitas Pasundan, Indonesia*

Control of pH Neutralization System Using Nonlinear Model Predictive Control with I-controller
Ayman Hermansson[1], S Syafiie[2]
[1]*SEGi University, Malaysia*
[2]*Universiti Putra Malaysia, Malaysia*

An Efficient Discrete Particle Swarm Optimization for Solving Multi-mode Resource-constrained Project Scheduling Problems
Jianshuang Cui, Liruoyang Yu
University of Science and Technology Beijing, China

Reliability Analysis Based on Three-dimensional Stochastic Differential Equation for Big Data on Cloud Computing
Yoshinobu Tamura[1], Kenta Miyaoka[2], Shigeru Yamada[2]
[1]*Yamaguchi University, Japan*
[2]*Tottori University, Japan*

Supply Chain Management II

11/12/2014 09:00 - 10:30
Room: Caymans 3

Chairs: Nunzia Carbonara
Egon Mueller

Abstracts: see page 54

Sourcing Decision with Correlated Supplier Disruption: An MV Framework
Pritee Ray, Mamata Jenamani
Indian Institute of Technology Kharagpur, India

A Brief Review on Information Sharing within Supply Chains
Farnoush Farajpour, Mohammad Taghi Taghavifard
Allameh Tabataba'i University, Iran

Ant Colony Optimization for One-to-Many Network Inventory Routing Problem
Lily Wong, Noor Hasnah Moin
University of Malaya, Malaysia

Analysis of Quantity Discounts for Multi-period Production Planning for Single Supplier and Retailer Under Uncertain Demands
Okihiro Yoshida[1], Tatsushi Nishi[1], Guoqing Zhang[2]
[1]*Osaka University, Japan*
[2]*University of Windsor, Canada*

The Cluster Policies to Nation Competitiveness Based on Business Ecosystem Perspective - Case Study of Taiwanese Smart Phone Industry
Yan-Ru Li
Aletheia University, Taiwan

Mitigating Supply Chain Risk: A Real Options Approach
Nunzia Carbonara, N. Costantino, Roberta Pellegrino
Politecnico di Bari, Italy

Supply Chain Management III

11/12/2014 11:00 - 12:30
Room: Caymans 3

Chairs: Yan-Ru Li
Abdul Rahman Abdul Rahim

Abstracts: see page 55

SCM Trends and Challenges - Implications from a Cross-industry Analysis
Felix Friemann[1], Markus Gerschberger[2], Kathrin Reitner[2], Paul Schönsleben[1]
[1]*Swiss Federal Institute, Switzerland*
[2]*Upper Austria University of Applied Sciences, Austria*

Vehicle Routing with Time Window for Regional Network Services - Practical Modelling Approach
Iman Niroomand[1], Amir H. Khataie[1], Masoud Rahiminezhad Galankashi[2]
[1]*Canada Post, Canada*
[2]*Universiti Teknologi Malaysia, Malaysia*

Development of a General Collaboration Model - Basis for the Establishment of a Collaboration Compass
Xiao-li Chen, Antonia Mahling, Ralph Riedel, Egon Müller
Technische Universität Chemnitz, Germany

Solving Inventory Routing Problem with Backordering Using Artificial Bee Colony
Huda Zuhrah Ab Halim, Noor Hasnah Moin
University of Malaya, Malaysia

Big Data Analytics for Supply Chain Management
Jens Leveling[1], Matthias Edelbrock[2], Boris Otto[1]
[1]*Fraunhofer-Institute for Material Flow and Logistics IML, Germany*
[2]*Technical University of Dortmund, Germany*

Multi Objective Supply Chain Network Design Considering Customer Satisfaction
Mahdi Bashiri[1], Hanieh Khorasani[2], Mahdyeh Shiri[1]
[1]*Shahed University, Iran*
[2]*Eyvanekey Institute of Higher Education, Iran*

Supply Chain Risk Management: A Method and Tool Contributing to the Operational Aspects
Elena Rokou[1], Konstantinos Kirytopoulos[2]
[1]*National Technical University of Athens, Greece*
[2]*University of South Australia, Australia*

Manufacturing Systems II

11/12/2014 13:30 - 15:00
Room: Caymans 3

Chairs: Urs Buehlmann
Bimal Nepal

Abstracts: see page 56

Joint Optimization of Production-maintenance Plans Based on Optimal Production Rates
Jeremie Schutz
Université de Lorraine, France

A New Bi-objective Mathematical Model for Sustainable Dynamic Cellular Manufacturing Systems
Farzad Niakan, Armand Baboli , Thierry Moyaux, Valerie Botta-Genoulaz
Université de Lyon, France

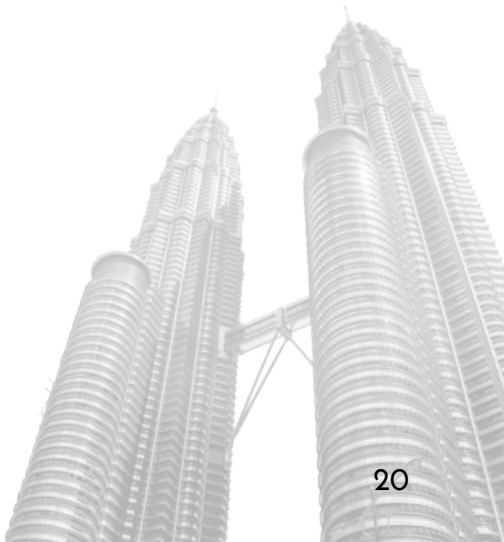
Optimization of Green Electrical Discharge Machining Using an Integrated Approach
Jagadish[1], Amitava Ray[2]
[1]*National Institute of Technology Silchar, India*
[2]*Jalpaiguri Government Engineering College, India*

A Conceptual Framework for the Performance Assessment of Lot Release Policies
Rashmi Singh, Muthu Mathirajan
Indian Institute of Science, India

Applying Lean and TOC to Improvement Delivery Performance for Machine Tool Manufacturers
Chuang-Chun Chiou[1], T.W. Jhang[2], Y. X. Deng[2], J.T. Tsai[2], C. Perng[2]
[1]*Dayeh University, Taiwan*
[2]*Tunghai University, Taiwan*

Interactive Virtual Machining System Using Informative Data Structure and On-site Machine Tool Status
Aini Zuhra Abdul Kadir[1], Xun Xu[2]
[1]*Universiti Teknologi Malaysia, Malaysia*
[2]*University of Auckland, New Zealand*

A Simulation Based System for Manufacturing Process Optimisation
Hossam Ismail[1], Lina Wang[2], Jenny Poolton[2]
[1]*Xian Jiaotong-Liverpool University, China*
[2]*University of Liverpool, United Kingdom*



Manufacturing Systems III

11/12/2014 15:30 - 17:00
Room: Caymans 3

Chairs: Nihal Jayamaha
Chuang-Chun Chiou

Abstracts: see page 57

Multi-skeleton Model for Top-down Design of Complex Modular Products
Dexin Chu, Xuening Chu, guolin Lv, Yuliang Su, Dongping Chen
Shanghai Jiao Tong University, China

Optimized Tool Path Planning in 5-Axis Flank Machining using Electromagnetism-like Algorithms
Chi Lung Kuo[1], Chih-Hsing Chu[1], Ying Li[2], Xinyu Li[2], Liang Gao[2]
[1]*National Tsing Hua University, Taiwan*
[2]*Huazhong University of Science & Technology, China*

Signal Propagation Model Calibration Under Metal Noise Factor for Indoor Localization by Using RFID
Seng Fat Wong, Xue Ni
University of Macau, Macau

Experiential Learning: Lean Team at Virginia Tech
Urs Buehlmann[1], Omar Espinoza[2]
[1]*Virginia Tech, United States*
[2]*University of Minnesota, United States*

The Backward Growing Method for Constructing 3D Process Models in the Machining Process Planning
Jinfeng Liu, Xiaojun Liu, Yalong Cheng, Zhonghua Ni
Southeast University, China

Proposal of a Decision Making Model to Select the Best Fitting Cost Estimation Technique in an ETO-MC Environment
Aldo Duchi[1], Golboo Pourabdollahian[2], Davide Sili[2], Matteo Cioffi[2], Marco Taisch[2]
[1]*ETH Zurich, Switzerland*
[2]*Politecnico di Milano, Italy*

Information Processing & Engineering II

11/12/2014 09:00 - 10:30
Room: Caymans 4

Chairs: SC Johnson Lim
Abdul-Wahid Saif

Abstracts: see page 58

Development of a Methodology for Cost-oriented Ramp-up Design
Achim Kampker, Christoph Deutskens, Andreas Maue
RWTH Aachen University, Germany

Discovering Product Feature and Affective Associations Through Collaborative Tagging
S. C. Johnson Lim[1], Suhaili Jawaris[2]
[1]*University Tun Hussein Onn Malaysia, Malaysia*
[2]*Universiti Tun Hussein Onn Malaysia, Malaysia*

Construction of an Interactive Behavioral and Feature Structure Model for Facebook
Tsung-Yi Chen[1], Meng-Che Tsai[2], Yuh-Min Chen[2]
[1]*Nanhua University, Taiwan*
[2]*National Cheng Kung University, Taiwan*

SWOT Analysis of NPTEL Knowledge Portal
Kalyan Kumar Bhattacharjee
Indian Institute of Technology Delhi, India

Life Cycle Inventory Analysis and Equivalent Carbon Dioxide Emissions Calculation of the Mining and Ore Concentration Processes of PGM at The Anglo American Platinum Ltd, South Africa
Junior Mabiza[1], Charles Mbohwa[1], Michael Mutingi[2]
[1]*University of Johannesburg, South Africa*
[2]*Namibia University of Science & Technology, Namibia*

Technology & Knowledge Management II

11/12/2014 11:00 - 12:30
Room: Caymans 4

Chairs: Michael Gepp
Seung Ki Moon

Abstracts: see page 59

Methodology for Resource Allocation in the Tool and Die Industry
Guenther Schuh, Martin Pitsch, Thomas Kühn, Advan Begovic
RWTH Aachen University, Germany

Measuring the Quality of Cooperation in Interdisciplinary Research Clusters
Stefan Schröder, Markus Kowalski, Claudia Jooss, R. Vossen, Anja Richert, Sabina Jeschke
RWTH Aachen University, Germany

Do We Miscount Patent Citations? An Empirical Study on the Impact of Overlooking the Citations to a Patent's Pre-grant Publication
Chung-Huei Kuan, Hsiang-Jui Cheng
National Taiwan University of Science and Technology, Taiwan

The Contribution of Technology to Improving Meanings: The Quantitative Analysis of Meanings
Satoru Goto, Shuichi Ishida
Ritsumeikan University, Japan

Advance of Research on Technology Acceptance
Ruiping Yang, Liyan Zhou, Xinxin Hou, Yiming Xiang
Zhejiang Gongshang University, China

Readiness of Malaysian E-Commerce Companies to Harness Web2.0's Competitive Advantage: An Engineering Management Approach
Ching Chieh Kiu[1], Chien-Sing Lee[2]
[1]*UCSI Universitty, Malaysia*
[2]*Universiti Tunku Abdul Rahman, Malaysia*

Educational Leadership: The Effects of Leadership in Students Educational Performance in Engineering Institutes
Subhashini Gopal Krishnan, Vinesh Thiruchelvam
Asia Pacific University of Technology and Innovation, Malaysia

Information Processing & Engineering III

11/12/2014 13:30 - 15:00
Room: Caymans 4

Chairs: Seng Fat Wong
Chih-Hsing Chu

Abstracts: see page 60

An Efficient Method for Checking Overlaps and Construction Algorithms for the Bitmap Shape Packing Problem
Sho Fukatsu, Yannan Hu, Hideki Hashimoto, Shinji Imahori, Mutsunori Yagiura
Nagoya University, Japan

Managing Conflict in Distributed Projects
Ramin Shahzadi, Mohsen Sadeghi, Asal Aghaz
Amirkabir University of Technology, Iran

Analysis of Scientific Research Structure in Singapore Using Bibliometrics and Network Analysis for Understanding Their Characteristics of R&D: A Case Study of Biomedical Field
Ken Hayashima, Haruki Sawamura, Ichiro Sakata, Yoichiro Matsumoto, Hajime Sasaki
The University of Tokyo, Japan

Modelling Financial Flow of the Supply Chain
Mohammad Hossein Jahangiri, Franjo Cecelja
University of Surrey, United Kingdom

Role of Walsh Codes and Pseudorandom Noise Sequences in CDMA
Puneet Chawla, Balwinder Singh
PEC University of Technology, India

Learning from Past Changes - Towards a Learning-oriented Engineering Change Management
Christoph Hollauer, Martina Wickel, Udo Lindemann
Technische Universität München, Germany

A Study of Applying Severity-weighted Greedy Algorithm to Software Test Case Prioritization During Testing
Yen-Ching Hsu, Kuan-Li Peng, Chin-Yu Huang
National Tsing Hua University, Taiwan

Technology & Knowledge Management III

11/12/2014 15:30 - 17:00
Room: Caymans 4

Chairs: Chung-Huei Kuan
Ralph Riedel

Abstracts: see page 61

Fasten Your Seatbelts, Turbulence Ahead: Environmental Turbulence as a Determinant of Absorptive Capacity
Valeria Stulova, Mait Rungi
Tallinn University of Technology, Estonia

A Preliminary Survey on Modeling Customer Requirements from Product Reviews Under Preference Uncertainty
Anies Zakaria, S. C. Johnson Lim
University Tun Hussein Onn Malaysia, Malaysia

Hybrid Intelligent Patent Mapping for Offshore Wind Industry Analysis
Chin Yuan Fan[1], Shou Hao Chang[1], P. S. Fan[2], L. F. Kao[3]
[1]*National Applied Research Laboratories, Taiwan*
[2]*China University of Science and Technology, Taiwan*
[3]*National Taipei University of Technology, Taiwan*

Users' Acceptance of IT and Its Impact on Knowledge Sharing: A Case in the South African Banking Industry
Abdulkadir Kolawole Bello, Kai-Ying Chan
University of Pretoria, South Africa

Interpretive Structural Model of Key Performance Indicators for Sustainable Manufacturing Evaluation in Cement Industry
Elita Amrina, Annike Lutfia Vilsi
Andalas University, Indonesia

What Innovation Managers Really Do - An Empirical Study About Tasks, Skills and Traits of Innovation Managers in Germany
Maximilian A. Maier
Friedrich-Alexander-Universitaet Erlangen-Nürnberg, Germany

E-Business & E-Commerce

11/12/2014 09:00 - 10:30
Room: Kaywest

Chairs: Jindong Li
Hing Kai Chan

Abstracts: see page 62

Adoption of Near Field Communication for Mobile Payment: Evidence from Macau
Kin Meng Sam[1], Chris Chatwin[2], Jing Xin Zhang[1]
[1]*University of Macau, China*
[2]*University of Sussex, United Kingdom*

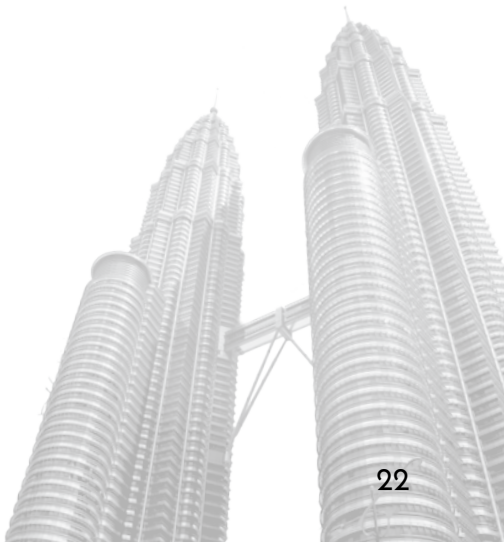
The Implementation Strategy of Key Task for ERP Activities
Te- King Chien, Ming-Sian Cheng
National Formosa University, Taiwan

Consumer Attitudes Toward Online Video Advertising: An Empirical Study on YouTube as Platform
Keng-Chieh Yang[1], Conna Yang[2], Chia-Hui Huang[3], Po-Hong Shih[2], Su Yu Yang Yang[2]
[1]*Hwa Hsia Technology of Univeristy, Taiwan*
[2]*National Chiao Tung University, Taiwan*
[3]*National Taipei College of Business, Taiwan*

The Role of Perceived Value on Customer E-shopping Intention Using Technology Acceptance Model, (TAM)
Ali Hajiha[1], Mohammad Reza Shahriari[1], Nayereh Vakilian[2]
[1]*Islamic Azad University, United Arab Emirates*
[2]*Islamic Azad University, Iran*

Probation of the Private Enterprises' Informatization in Wenzhou
Jindong Li, Jixuan Feng
Zhejiang Wanli University, China

Cloud Manufacturing for a Service-oriented Paradigm Shift
Yuqian Lu, Xun Xu
University of Auckland, New Zealand



Reliability & Management Engineering

11/12/2014 11:00 - 12:30
Room: Kaywest

Chairs: David Valis
Sanjay Kumar Palei

Abstracts: see page 63

Software Hazard Rate Modeling with Multiple Change-Point Occurrences
Shinji Inoue, Shigeru Yamada
Tottori University, Japan

Reliable System Design Under Uncertainty
Mengqi Li, Minghong Han, Jiaqi Xu
Beihang University, China

Integration of Failure Prediction Bayesian Networks for Complex Equipment System
Weitao Si, Zhiqiang Cai, Shudong Sun, Shubin Si
Northwestern Polytechnical University, China

Prediction of Vehicle further Operation and Fault Based on Tribo-diagnostic Data
David Valis[1], Libor Zak[2], J. Chaloupka[3]
[1]*University of Defence, Czech Republic*
[2]*University of Technology, Czech Republic*
[3]*Military Technical Research Institute, Czech Republic*

Estimation of System Residual Useful Life Based on Selected Tribo Data
David Valis[1], Ondrej Pokora[2]
[1]*University of Defence, Czech Republic*
[2]*Masaryk University, Czech Republic*

Project Management II

11/12/2014 13:30 - 15:00
Room: Kaywest

Chairs: Thierry Coudert
Premaratne Samaranayake

Abstracts: see page 64

Knowledge Transfer in Project-based Organizations. A Conceptual Model for Investigating Knowledge Type, Transfer Mechanisms and Transfer Success
Corro van Waveren[1], Leon Oerlemans[2], Marthinus Pretorius[1]
[1]*University of Pretoria, South Africa*
[2]*Tilburg University, Netherlands*

A Conceptual Multi-dimensional Evaluation Model for New Product Portfolio Management – Using Hybrid Fuzzy Model of AHP-DEA
Kiranmayi Pulipaka, Muthu Mathirajan
Indian Institute of Science, India

A Recommendation on PLUS Highway Development: A Social Network Analysis Approach
Norhaidah Mohd Asrah[1], Maman Abdurachman Djauhari[2]
[1]*Universiti Tun Hussein Onn Malaysia, Malaysia*
[2]*Universitas Pasundan, Indonesia*

Evaluating Risk Factors in the Operation of Virtual Teams in ICT Projects
Nikos Rassias[1], Konstantinos Kirytopoulos[2]
[1]*National Technical University of Athens, Greece*
[2]*University of South Australia, Australia*

Instructional Design for Online Course Delivery in Engineering Management: Synthesizing Learning Styles, Pedagogical Perspectives and Contingency Factors
Senevi Kiridena[1], Premaratne Samaranayake[2], David Hastie[1]
[1]*University of Wollongong, Australia*
[2]*University of Western Sydney, Australia*

Identifying Critical Project Management Techniques and Skills for Construction Professionals to Achieving Project Success
Jui-Sheng Chou, Ngoc-Tri Ngo
National Taiwan University of Science and Technology, Taiwan

Systems Modeling & Simulation II

11/12/2014 15:30 - 17:00
Room: Kaywest

Chairs: Syafiie Syafiie
Aini Zuhra Abdul Kadir

Abstracts: see page 65

An Ising-based Approach to the Study of Inter-organizational Team Dynamics
Ilaria Giannoccaro, Ilario De Vincenzo, Giuseppe Carbone
Polytechnic University of Bari, Italy

Individual Versus Integrated Simulation Techniques in Healthcare Applications
Mohammed Abdelghany[1], Amr B. Eltawil[2]
[1]*Egypt-Japan University of Science and Technology (E-JUST), Egypt*
[2]*Egypt - Japan University of Science and Technology (E-JUST), Egypt*

CFD Analysis of Chlorine Gas Dispersion In Indoor Storage: Temperatures with Wind Velocities Effect Studies
Mohsen Safakar, S Syafiie, Robiah Bt. Yunus
Universiti Putra Malaysia, Malaysia

Depicting Product-service Systems in the Early Phase of the Product Development
Daniel Kammerl[1], Martin Enseleit[1], Robert Orawski[1], Danilo Marcello Schmidt[2], Markus Mörtl[1]
[1]*Technische Universität München, Germany*
[2]*Technical University of Munich, Germany*

No Clutch Fuzzy Logic-controlled Hybrid Transmission
Essam Esmail[1], Hamed Hussain[2], Rahman Hussain[2]
[1]*University of Al Qadissiyah, Iraq*
[2]*Middle Technical University, Iraq*

Fractional Order PI Controller for Wind Farm Supervision
Boualem Benlahbib[1], Noureddine Bouarroudj[1], Farid Bouchafaa[2], Bachir Baton[1]
[1]*Unité de Recherche Appliquée en Energies Renouvelables, URAER, Algeria*
[2]*Laboratoire d'Instrumentation, Faculté d'Electronique et d'Informatique USTHB, Algeria*

Multi-objective Genetic Algorithm in Green Just-in-time Logistics
Ashkan Memari, Abdul Rahman Abdul Rahim, Robiah Ahmad
Universiti Teknologi Malaysia, Malaysia

Safety, Security & Risk Management

11/12/2014 09:00 - 10:30
Room: Cancun

Chairs: Netai Chandra Karmakar
Elena Rokou

Abstracts: see page 66

A Taxonomy of Security and Privacy Requirements for the Internet of Things (IoT)
Israa Alqassem, Davor Svetinovic
Masdar Institute of Science and Technology, United Arab Emirates

Friction Measurements on Floors Under Solid Contaminated Conditions
Kai-Way Li, T-Y Pei
Chung Hua University, Taiwan

Understanding Hazards and Risks in Modern Sociotechnical Systems: Systemic Approach to Identify Human, Organizational and Technical Factors
Haftay Hailay Abraha, Jayantha P. Liyanage
University of Stavanger, Norway

Effects of Demography and Occupational Traits on Consequence of Injury of Underground Coal Miners
Sanjay Kumar Palei, Netai Chandra Karmakar, Rutwick S. M. Reddy
Indian Institute of Technology (B.H.U), India

Risk Analysis and Rescue Operation for Machine Roomless Lift: A Case Study
Choo Yong Lee[1], Chin Huat Lim[2]
[1]*Robert Bosch Sdn. Bhd., Malaysia*
[2]*Shinyou Elevator Manufacturing Sdn. Bhd., Malaysia*

Modeling of Tolerable Repair Time Without Affecting System Reliability
Aishwarya Mishra, Pranab Murari, Sanjay Kumar Palei, Suprakash Gupta
Indian Institute of Technology (B.H.U), India

Production Planning & Control II

11/12/2014 11:00 - 12:30
Room: Cancun

Chairs: Ahmed El-Bouri
Bholanathsingh Surajbali

Abstracts: see page 67

Planning and Scheduling across the Supply Chain: Simulation-based Validation of the Unitary Structuring Technique
Premaratne Samaranayake[1], Senevi Kiridena[2], Dalin Cai[2]
[1]*University of Western Sydney, Australia*
[2]*University of Wollongong, Australia*

Optimal Planning of Biodiesel Supply Chain Using a Linear Programming Model
Maryam Valizadeh, Syafiie Syafiie, I.S. Ahamad
University Putra Malaysia, Malaysia

A Simple Multiple Objective Linear Programming Model on Customization Manufacturing for Metal Steel Making Effectiveness
Earl-Juei Wang[1], Chin-Shih Tsou[2]
[1]*National Pingtung University of Science and Technology, Taiwan*
[2]*National Taipei University of Business, Taiwan*

Mixture of Two Different Scheduling Policies in a Class of Discrete Event Systems
Hiroyuki Goto, Hajime Yokoyama
Hosei University, Japan

A Cloud-based Approach for Collaboration of Serviced-enhanced Products
Bholanathsingh Surajbali, Adrian Juan-Verdejo, Holger Baer, Spiros Alexakis, Gerald Hübsch, Markus Bauer
CAS Software AG, Germany

Human Factors II

11/12/2014 13:30 - 15:00
Room: Cancun

Chairs: Perminderjit Singh
Chien-Sing Lee

Abstracts: see page 68

Selecting a Shift System Based on the Analytical Hierarchy Process
Alexander Rannacher, Susanne Mütze-Niewöhner, Christopher M. Schlick
RWTH Aachen University, Germany

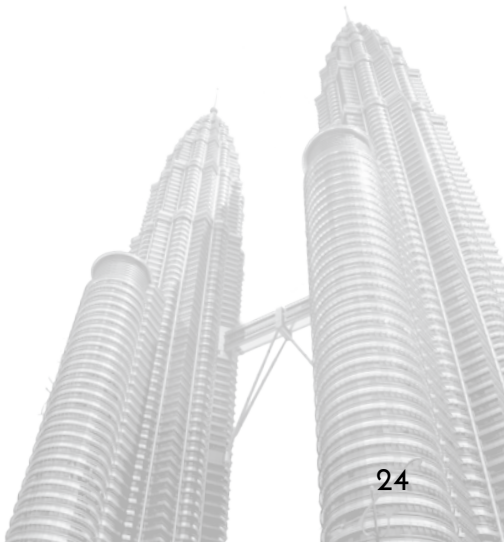
Differentiated Customer Needs' Analysis for User Experience
Danilo Marcello Schmidt, Josu Urquidi Guerrero, Ioanna Michailidou, Udo Lindemann
Technical University of Munich, Germany

Deriving the Relationship Between User Satisfaction on Engine Sounds and Affective Variable Sets Based on Classification Algorithms
Wonjoon Kim, Gawon Kim, Yushin Lee, Myung Hwan Yun
Seoul National University, South Korea

Gesture Interface Appropriateness Analysis on Smart TV Functions
Jaehong Lee, Byungki Jin, Soo-chan Jee, Jiyoon Han, Myung Hwan Yun
Seoul National University, South Korea

Employee Involvement and Training in Environmentally Conscious Manufacturing Implementation for Indian Manufacturing Industry
Perminderjit Singh[1], Kuldip Singh Sangwan[2]
[1]*PEC University of Technology, India*
[2]*Birla Institute of Technology and Science, Pilani, India*

A Toolkit Based on NK Fitness Landscape for Behavioral Investigation in Complex Supply Chains
Ilaria Giannoccaro
Politecnico di Bari, Italy



Intelligent Systems II

11/12/2014 15:30 - 17:00
Room: Cancun

Chairs: Samreen Amir
Chin Yuan Fan

Abstracts: see page 69

A Priority Based Optimization Algorithm for Multi-objective Integrated Process Planning and Scheduling Problem
Muhammad Farhan Ausaf, Xinyu Li, Liang Gao
Huazhong University of Science and Technology, China

The Knowledge Sharing Model on Supply Chain Simulation Using Recurrent Neural Network
Fumiaki Saitoh
Aoyama Gakuin University, Japan

Implementation of Line Tracking Algorithm using Raspberry Pi in Marine Environment
Samreen Amir[1], Ali Akbar Siddiqui[2], Nimrah Ahmed[2], Bhawani Shankar Chowdhry[3]
[1]*Hamdard University, Pakistan*
[2]*Sir Syed University of Engineering & Technology, Pakistan*
[3]*Mehran University of Engineering & Technology, Pakistan*

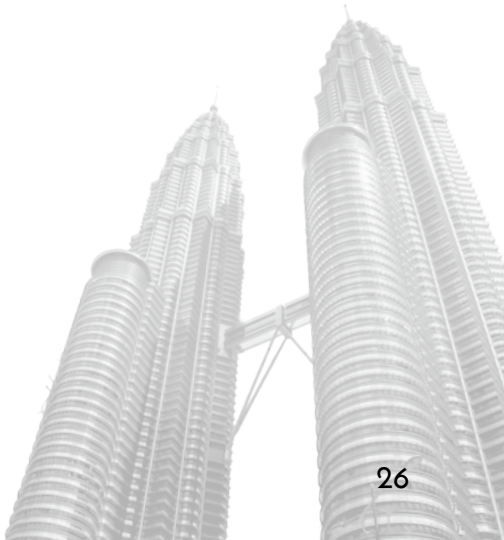
Physical Layer Design of Optical Networks with Practical Considerations
Kin Fan Poon[1], Anis Ouali[1], Beum Lee[2]
[1]*Khalifa University of Science, Technology and Research, United Arab Emirates*
[2]*Etisalat British Telecom Innovation Centre, United Arab Emirates*

Developing Target Marketing Models for Personal Loans
Jen-Ying Shih[1], Wun-Hwa Chen[2], Yu-Jung Chang[3]
[1]*National Taiwan Normal University, Taiwan*
[2]*National Taiwan University, Taiwan*
[3]*Academia Sinica, Taiwan*

Developments and Trends in Shopfloor-related ICT Systems
Olaf Sauer
Fraunhofer IOSB, Germany

Poster Session

11/12/2014 15:00 - 15:30
Room: Jamaica



Abstracts

Session	Decision Analysis & Methods I
Date	10/12/2014
Time	13:30 - 15:00
Room	Casablanca
Chairs	Shin-Guang Chen, Shino Iwami

Simultaneous Consideration of Remanufactured and New Products in Optimal Product Line Design

Ridvan Aydin, C.K. Kwong, Ping Ji
The Hong Kong Polytechnic University, Hong Kong SAR

Remanufactured products are normally remanufactured from returned new products. Thus, they can be treated as product variants under the product line of the new products and should be considered together with new products in product line design to obtain the maximum profit and market share of the product line. This paper proposes a methodology for optimal product line design with simultaneous consideration of remanufactured and new products which mainly involves development of dynamic demand models and multi-objective optimization. The optimization model is solved by nondominated sorting genetic algorithm II (NSGA-II) and optimal Pareto solutions of product line design that include specifications and prices of both remanufactured and new products, estimated profits and market share as well as the time of launching remanufactured products. A case study was conducted to illustrate the effectiveness of the proposed methodology.

The Optimal Ordering Quantity with Uncertain Food's Safety Environment

Shu-Yen Hsu, Tyrone T. Lin
National Dong Hwa University, Taiwan

Under the deterioration of food safety environment of food suppliers and the uncertainty of food safety of the purchased food by individual manufacturer, this study aims to establish a mathematical model standard basis as a reference for decision evaluation on the optimal order quantity of food raw materials to satisfy the maximum expected returns, according to the food safety situations and market acceptance (optimistic/normal/pessimistic), thus affecting procurement costs and selling prices.

Reduced Recursive Inclusion-exclusion Principle for the Probability of Union Events

Shin-Guang Chen
Tungnan University, Taiwan

The probability of union events is always important in management science. Many real life applications use such probability in their core implementations. The most popular method to calculate the probability of union events is the Inclusion-Exclusion Principle (IEP), which originates from the idea of Abraham de Moivre (1718). However, the computation complexity is exact O(2^n), and no matter what the events are, the complexity order can not be decreased. A much efficient method namely Recursive Inclusion-Exclusion Principle (RIEP) was constructed by rearranging its equation to its recursive form. The computation complexity is also O(2^n) in the worse cases, but it usually has 10 times efficiency than IEP in the normal cases. This paper proposed a novel reduction method for the RIEP to calculate the probability of union events, which can obtain over 100 times efficiency than RIEP in normal cases, and in the worse cases, it has at least the same complexity as that of RIEP. Some benchmarks on network reliability applications show that the proposed approach is very efficient.

A Bi-level Algorithm for Product Line Design and Pricing

Shuli Wu, Songlin Chen
Nanyang Technological University, Singapore

Product line design and pricing are crucial activities for a firm's success especially in a competitive market with high product variety. Recent literature has reported various profit-maximization models with product mix and prices as decision variables. Product mix is a discrete variable while price is treated as a continuous variable. Optimizing both mix and price simultaneously can be challenging. This paper utilizes discrete choice model and activity-based costing to formulate market demand and manufacturing cost of a product line and proposes a bi-level algorithm, which uses genetic algorithm for optimizing product mix and differential evolutionary for optimizing prices for a product line. A case study on smart phones is carried out to illustrate this optimization algorithm.

An Optimal Electricity Consumption Decision with a Limited Carbon Emission Concept

Tyrone T. Lin, Hui-Chen Lan
National Dong Hwa University, Taiwan

This paper aims to explore the strategy of electricity-using industries' optimal electricity selection by using the binomial option pricing model to analyze the values of various stages in the process. Due to variable electricity using and the worldwide regulation of carbon emissions, this paper tries to investigate the hedge behavior of conservative and adventure energy-using industries' carbon emission strategy and build a maximum financial model for decision-making and the flexible approach of strategy management. How to provide the policymakers of enterprises with a reference of planning the optimal electricity consumption in every decision-making time is the most important. This paper contributes to increase the eco-economic value of enterprises under the restriction of carbon emissions.

An Integrated Data Envelopment Analysis (DEA) and Hedge Accounting Approach for Risk Management Efficiency Measurement: Evidence From Derivative Market in Asia-pacific Banks

Shahsuzan Zakaria, Sardar M. N. Islam
Victoria University, Australia

Financial derivatives products are believed to be significant tools for mitigating market risks. Accounting practice treats transactions on financial derivatives to highlight its role on the items being hedged (hedged items) but it does not represent a holistic context of the derivative instrument used, particularly as a risk management tool. This study develops an extension of hedge effectiveness analysis tested by dollar-offset ratio integrated with a nonparametric approach (Data Envelopment Analysis – DEA) to provide an overall evaluation of derivatives for risk management. Twelve banks in Asia-Pacific region are selected as a sample. The twofold results of analysis first indicate the implications on the extension of hedge effectiveness test using DEA, and second, discuss the differences in bank's risk management efficiency between developed and developing markets.

Session	Decision Analysis & Methods II
Date	10/12/2014
Time	15:30 - 17:00
Room	Casablanca
Chairs	Yves De Smet, Saku Mäkinen

A Fuzzy Linguistic Representation Model for Decision Making Under Uncertainty

Wen-Tao Guo, Van-Nam Huynh
Japan Advanced Institute of Science and Technology, Japan

Taking into account imprecise and incomplete information is very important for properly making a decision under uncertainty. However, due to inherent mechanism, many traditional approaches cannot deal with such problems. Motivated by this point, we propose a proportional fuzzy linguistic distribution model for decision making under uncertainty. It is shown that this new model not only allows experts to linguistically assess attributes by using the combinations of any number of adjacent evaluation grades, but is also applicable to the context that experts cannot supply complete linguistic assessments. In addition, we also introduce expect utility in proportional fuzzy linguistic distribution for the purpose of precisely ranking alternatives, and accordingly, conveniently making a final decision. Finally, a case study taken from the literature is used to illustrative the proposed model.

Post Optimality Analysis of Pareto Optimal Set Through Weights Robustness

Maria Kalinina, David Sundgren
Stockholm University, Sweden

Traditional multi-objective optimization attempts to find Pareto optimal solutions. Since a Pareto optimal set can be huge, the problem of selecting one or few solutions occurs. Post optimality analysis in multi-objective optimization requires incorporation of decision makers' preferences in the form of weights. In this paper the concept of robustness with regards to weights is introduced. The different types of weights robustness show how sensitive a solution is to variation in weights' coefficients. An approach for analysis of Pareto optimal sets through weights robustness is then devised. The suggested approach can be of special interest in the presence of conflicting preferences among decision makers or when preference information is unavailable. In conclusion, managerial usage it in the different strategies for negotiation provides possibility to thoroughly weigh all alternatives before settling on an agreement.

Adapting the ISO31000:2009 Enterprise Risk Management Framework Using the Six Sigma Approach

Bennie Seck-Yong Choo, Jenson Chong-Leng Goh
SIM University, Singapore

Enterprise risk management has never been more important in today's organizations. The rapid changes brought forth by the technological advancements and globalization, and the complexity in managing these changes has made it challenging for an organization to manage its risks effectively. The ISO31000:2009 enterprise risk management (ERM) framework was developed in an attempt to help organizations address this challenge. Unfortunately, the framework is highly abstract and consists of confusing terms and definitions, which make it difficult to be adapted according to an organization's risk management requirements. Using the Six Sigma approach, this paper presents a pragmatic roadmap on the process of adapting the ISO31000:2009 ERM framework in a business unit of a large organization operating globally. In so doing, this study helps to provide invaluable insights and a viable method to adapt the ISO31000:2009 framework into a number of effective risk management practices in an organization.

A Framework to Identify Sustainability Indicators for Product Design

Sam Yeon Kim[1], Seung Ki Moon[1], Hyung Sool Oh[2], Taezoon Park[3], HaeJin Choi[4], Hungsun Son[5]
[1]*Nanyang Technological University, Singapore*
[2]*Kangwon National University, South Korea*
[3]*Soongsil University, South Korea*
[4]*Chung-Ang University, South Korea*
[5]*Ulsan National Institute of Science & Technology, South Korea*

Various sustainability indicators have been developed by governments, international organizations, and companies according to their different perspectives. It makes companies difficult to choose proper sustainability indicators for consistent assessments of sustainable products. In this paper, we propose a framework to determine specific categories of sustainability indicators according to design strategies, requirements of customers and legislation. In the proposed framework for company level approach, House of Quality (HOQ) is applied to understand the relationship among potential category indicators, customer needs, and product components. The results of the HOQ are visualized by system dynamics. To define characteristics of nodes of the indicators, the term of change propagation index (CPI) is used. The multiplier characteristic from CPI that has more outputs than inputs would be considered as high priority among potential category indicators. A case study with a coffee maker is performed to demonstrate the effectiveness of the framework.

An Interactive Bi-criteria Heuristic Algorithm for the Coherent System Assembly

Abdel-Aziz M. Mohamed
Arab Academy for Science, Technology, and Maritime Transport, Egypt

This paper presents a heuristic algorithm allocating non-repairable components to the nodes of a coherent system resulting in higher reliability at a lower cost. Component reliabilities are considered independent of their assigned nodes and can be allocated to any node in the system. The algorithm ranks the nodes according to their critical importance, allocates the component with the higher reliability to that of the higher ranking node and; generates efficient solutions using the largest cost-profit trade-off. The decision maker has the option to interact with the algorithm during the solution process to articulate his/her preference regarding the best compromised solution. He/she may also choose to submit a minimum acceptable stance of the reliability-cost trade-off that can be used as a stopping criterion for the algorithm. Several numerical examples are illustrated to exemplify the main concepts of the algorithm and how it is used. Experimental studies are carried out.

Optimal Trial Number for D-optimal Designs Based on Efficiency-cost Ratio Analysis

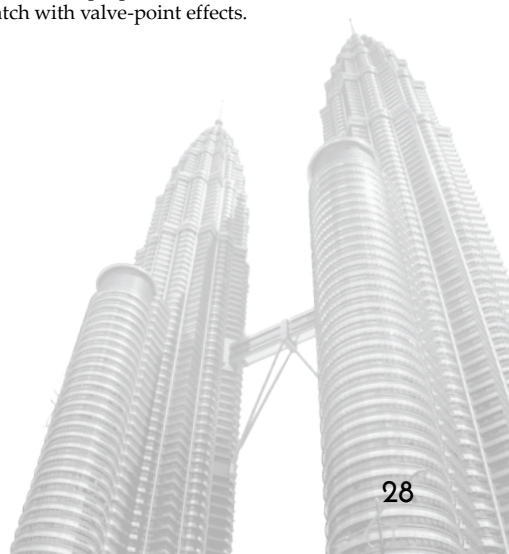
XiuTing Liu, Sen Lin, Jun Yang
Beihang University, China

In engineering experiments, the more trial times are not always the better, especially for high-cost and long-period ones. But in practice, the trial number usually only depends on the design efficiency without considering the cost of an experiment, which may cause unnecessary waste. So, the optimal trial number of D-optimal design is investigated in this paper. Based on efficiency-cost ratio (E-C ratio) and considering the G-efficiency, a determination method for the optimal trial number of D-optimal design is given. The proposed method is applied to the cutting process of aluminum alloy thin-walled workpiece, and the results show the effectiveness of the proposed method.

Swarm Based Mean-variance Mapping Optimization (MVMO^s) for Economic Dispatch Problem with Valve - Point Effects

Khoa Truong [1], Pandian Vasant[1], Balbir Singh Mahinder Singh[1], Dieu Vo[2]
[1]*Universiti Teknologi Petronas, Malaysia*
[2]*HCMC University of Technology, Viet Nam*

Mean-variance mapping optimization (MVMO) is a novel population-based meta-heuristic technique which has been successfully applied for different power system optimization problems. The special feature of MVMO is the mapping function applied for the mutation based on the mean and variance of n-best population. Recently, the modified version of MVMO has been developed to get more powerful, named as Swarm based Mean-variance mapping optimization (MVMO^S). This paper proposes MVMO^S as a new approach for solving the economic dispatch problem considering valve-point effects. To demonstrate the performance of the proposed method, the proposed MVMO^S has been tested on two systems including 3 and 13 thermal generating units with valve-point effects and the obtained results from MVMO^S have been compared to those from other existing methods in the literature. It is indicated that the proposed MVMO^S is efficient for solving the economic dispatch with valve-point effects.



Session	Operations Research I
Date	10/12/2014
Time	13:30 - 15:00
Room	Caymans 1
Chairs	Yuliang Su, Earl-Juei Wang

A Multicriteria Decision Model for Technology Readiness Assessment for Energy Based on PROMETHEE Method with Surrogate Weights

Adiel Almeida[1], Danielle C Morais[1], Luciana Alencar[1], Tharcylla Clemente[1], Eduardo Krym[1], C. Z. Barboza[2]
[1]*Federal University of Pernambuco, Brazil*
[2]*2CGEE Centro de Gestão e Estudos Estratégicos, Brazil*

This paper deals with the decision-making context with imprecise information regarding importance of objectives. The PROMETHEE method is integrated with surrogate weights in order to approach this situation. PROMETHEE methods have been applied in many contexts and this paper illustrates its use in the context of Technology Readiness Assessment for Energy. This strategic decision problem involves a situation in which imprecise information is always a challenge.

An Imperialist Competitive Algorithm for the Job Shop Scheduling Problems

Hamed Piroozfard, Kuan Yew Wong
Universiti Teknologi Malaysia, Malaysia

Scheduling is assigning a set of tasks on resources in a time period, taking into account the time, capability and capacity constraints. The job shop scheduling problems are the most important problems in management science and combinatorial optimization. These problems belong to the family of NP-hard, in which they cannot be solved in polynomial time (unless P=NP). In this paper, a meta-heuristic algorithm is proposed for solving the job shop scheduling problems with the objective of minimizing makespan. A meta-heuristic approach called imperialist competitive algorithm which imitates the behavior of imperialistic competition is presented. This algorithm is constructed with countries, colonies and imperialists in which colonies and imperialists make the empires. The algorithm starts with initializing the countries and empires. In addition, the algorithm continues the search process by applying assimilation and revolution operators. To further improve the solution quality obtained by the imperialist competitive algorithm, simulated annealing is applied. A set of well-studied benchmarking instances obtained from the OR-Library is used to evaluate the performance of the proposed algorithm, and the computational results indicate its efficiency.

Impact Evaluation of MGNREGA Using Data Envelopment Analysis

Devaraj Hanumappa, Parthasarathy Ramachandran, T. G. Sitharam
Indian Institute of Science, India

Malmquist Index is the widely used method to measure the productivity change between two time periods. In this paper we develop a new method to evaluate the productivity change using Data Envelopment Analysis. An illustration is presented in this paper to evaluate the impact of Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA). The impact is calculated by comparing the change in the production function before and after the intervention.

Critical Literature Review on Maturity Models for Business Process Excellence

Saja Albliwi, Jiju Antony, Norin Arshed
Heriot-Watt University, United Kingdom

Maturity models are a useful way for an organisation to assess their processes and the overall maturity levels of the organisation. However, finding the most appropriate maturity model is not an easy task especially for practitioners in industry. Hence, the purpose of this paper is to critically review, compare and contrast the existing maturity models in quality/operations management topics. This paper has reviewed the most common maturity models including but not limited to Bessant's continuous improvement capability model, Capability Maturity Model (CMM) and Capability Maturity Model Integration (CMMI) which is the most common model in the literature. The authors have observed a lack of maturity models for process management. Therefore, the future plan for this research is to develop a maturity model for a specific area in process management, which is Lean Six Sigma (LSS), as this is the main area of interest for the authors.

A Modified Genetic Algorithm for Precedence Constrained Operation Sequencing Problem in Process Planning

Yuliang Su, Xuening Chu, Dongping Chen, Dexin Chu
Shanghai Jiao Tong University, China

Precedence constrained operation sequencing problem (PCOSP) is concerned with selection of feasible and efficient operation sequence with minimal machining cost in process planning. Traditional genetic algorithm (GA) generates solution sequence by using randomly selection and insertion of operations, which will break the precedence constraints between operations. The additional fixing approaches for the infeasible solutions will result in low efficiency. Some modified GAs could generate feasible solutions but have premature convergence problem when facing complicated precedence constraints. To overcome the shortcomings, this paper proposed a modified GA that use an edge selection based chromosome encoding approach to make sure all the precedence constraints are met in every step. The experiment illustrates that the proposed GA has superiority in finding optimal or near optimal solution.

Building Master Surgery Schedules with Leveled Bed Occupancy and Nurse Workloads

Zakaria Abdelrasol[1], Nermine Harraz[2], Amr B. Eltawil[3]
[1]*Egypt-Japan University of Science and Technology (E-JUST), Egypt*
[2]*Alexandria University, Egypt*
[3]*Egypt - Japan University of Science and Technology (E-JUST), Egypt*

The master surgery scheduling problem involves the development of a master surgical schedule, a cyclic timetable that determines the patient category associated with each block of operating room time. A myriad of variants of the problem has been addressed in literature. Here we focus on two major variants, arising during cooperation with Karmoze hospital, a non-profit hospital located in Alexandria, Egypt. The first variant asks for balancing both beds and nurses daily requirements, whereas the second for considering surgeons preferences. To cope with these problems we introduce a new mixed integer formulation. The objective function minimizes the weighted sum of peaks in the daily bed occupancy and nurse daily workloads. The results show that our model provides a more leveled daily bed occupancy and nurse requirements. Furthermore, our model reduces both the daily bed occupancy and nurse workloads.

Session	Operations Research II
Date	10/12/2014
Time	15:30 - 17:00
Room	Caymans 1
Chairs	Amr Eltawil, Shinji Inoue

Resolution of Resource Conflicts in the CCPM Framework Using a Local Search Method

Hiroki Koga, Hiroyuki Goto, Eishi Chiba
Hosei University, Japan

We propose approximate methods for resolving resource conflicts in the Critical Chain Project Management (CCPM) method. The CCPM method consists of five processes. Effective approaches for four of the five processes already exist. For the remaining unresolved process, namely the resolving of resource conflicts, an effective method has yet to be proposed. Hence, we develop three simple approximate solving methods, and improve these using a local search. Methods based on the earliest and latest start times are used. The local search method undertakes a basic search by swapping the processing order of two arbitrary tasks. Through numerical experimentation, we found that these solving methods are practical if the number of outputs is one. In addition, the average value of the solutions obtained by the three simple methods was improved by up to approximately 10% when a local search was used if the number of tasks was 50.

A Heuristic Algorithm for the Prize Collecting Steiner Tree Problem

Yuki Hosokawa, Eishi Chiba
Hosei University, Japan

The Prize Collecting Steiner Tree (PCST) problem is one of the most important problems in the field of combinatorial optimization. In this paper, we consider new heuristics for the PCST problem. The heuristics consists of two stages. The first stage of the heuristics is to compute a spanning tree, which is based on the greedy approach. In the second stage of the heuristics, each arc in the spanning tree is checked. Throughout this checking, if the deletion of arcs improves the objective function value, then such arcs are deleted from the spanning tree. Next, we implement the heuristics for computational experimentation. In computational experimentation, we use approximation ratio as a key to evaluation values. From our computational experimentation, we confirm that the heuristics method is very fast.

3D Loading Problem Formulation Using Mixed Integer Nonlinear Programming

Mojahid Saeed Osman[1], Bala Ram[2]
[1]*King Fahd University of Pertoleum & Minerals, Saudi Arabia*
[2]*North Carolina A&T State University, United States*

The manufacturing of different types of cylindrical parts requires loading of parts into baskets for heat treatment operation. This loading process is complex and involves issues relating to geometry, and heterogeneity in the parts and in their processing requirements. The parts loaded for heat treatment often do not utilize the available capacity adequately because layer-loading is accomplished by operator ingenuity. Productivity in heat treatment operation can be increased by improving utilization, which is determined by the loading process. This paper describes the development mathematical model using mixed integer nonlinear formulation for loading of cylindrical parts into baskets. The mathematical modeling considers the exact location of parts to be loaded on the layers with the primary objective of minimizing unutilized volume of the baskets.

A Hybrid PSO-TS Approach for Proportionate Multiprocessor Open Shop Scheduling

Tamer Abdelmaguid
Cairo University, Egypt

In this paper, a hybrid particle swarm optimization (PSO)-tabu search (TS) approach is proposed for solving the proportionate multiprocessor open shop scheduling problem (PMOSP) with the objective of minimizing the makespan. The PSO part of the proposed approach is used for randomly searching the machine selection decisions, while the TS part conducts local improvements for the routing and sequencing subproblems. Experimentations are conducted on 100 benchmark problems which are divided into four equal sets with 2, 4, 8 and 16 processing centers. The analysis shows that the proposed hybrid approach produces competitive results compared to previously developed TS and genetic algorithm approaches, especially for intermediate size problems of 4 and 8 processing centers. The average optimality gap of the proposed approach is found to be below 5.6% from the lower bound for the four sets, and ten new upper bounds are found, among them two are provably optimal.

An Improved Approach for the Quay Crane Assignment Problem with Limited Availability of Internal Trucks in Container Terminal

A. Karam[1], Amr B. Eltawil[1], Nermine Harraz[2]
[1]*Egypt - Japan University of Science and Technology (E-JUST), Egypt*
[2]*Alexandria University, Egypt*

In container terminals, the handling operation of containers depends on the interaction among handling equipment such as quay cranes, yard cranes and internal trucks. Insufficient number of internal trucks causes a delay in transporting containers and results in low productivity of quay cranes which is the bottleneck of any container terminal. This paper presents a new approach for assigning quay cranes in container terminal taking into consideration the availability of internal trucks. A two phase solution methodology is proposed. In the first phase, a MIP model is formulated to assign quay cranes to vessels while the second phase, dynamic programming is used to determine the specific quay cranes to serve each vessel. The contribution of the proposed approach is demonstrated by a comparison against a case study from literature. Moreover, the results show that the shortage in the required number of internal trucks increases the average handling time per vessel.

Asset Integrity of Deepwater Petroleum Production Facilities

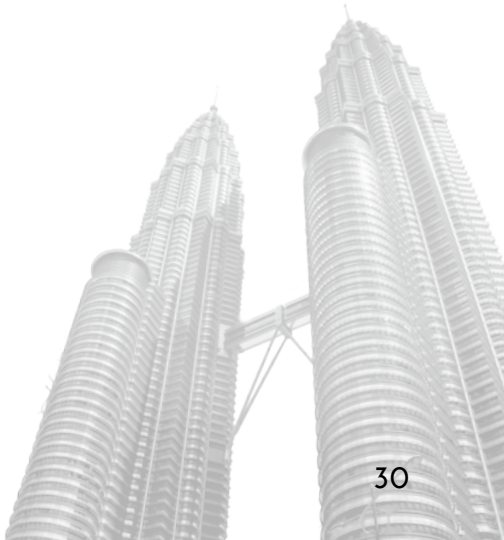
Mayang Kusumawardhani, Tore Markeset
University of Stavanger, Norway

Technology developments have made it possible to discover and harvests oil from deepwater reserves, but, maintaining asset integrity of deepwater facilities is not without challenges. This is due to the unique site characteristic and uncertainties in predicting future performances. Based on a literature survey and interviews with industrial experts, this paper investigates challenges in the integrity management of deepwater petroleum production assets. A workflow is proposed as guideline to established integrity management plan. In addition, industrial service strategy will be discussed as an alternative solution to deepwater challenges

Standardization Programs in the Industrial Plant Business: Best Practices and Lessons Learned

Michael Gepp, Jan Vollmar, Thomas Schaeffler
Siemens AG, Germany

Organizations in the industrial plant business face shorter product lifecycles and a rising complexity of their manufactured products. A common approach to increase the profitability are standardization programs. The underlying methodology of modularization and standardization is already successfully used the product business. In plant engineering business however standardization programs are only slowly gaining ground, mainly due to the high customer specificity and small volume produced in this business. Nevertheless researchers agree that standardization programs have great potential. In this contribution, six standardization programs of a German engineering organization were analyzed in case studies. Based on these programs best practices and lessons learned are identified. The knowledge of these success factors as well as examples how these factors can be practically used will support engineering organizations to conduct their standardization programs more efficiently.



Session	Quality Control & Management I
Date	10/12/2014
Time	13:30 - 15:00
Room	Caymans 2
Chairs	Imad Alsyouf, Yoshinobu Tamura

Modeling Autocorrelated Process Control with Industrial Application

Siaw Li Lee[1], Maman Abdurachman Djauhari[2], Ismail Mohamad[1]
[1]*Universiti Teknologi Malaysia, Malaysia*
[2]*Universitas Pasundan, Indonesia*

In past literature, a primary solution to deal with autocorrelated process data consists of two steps, namely (i) time series model building and (ii) control charting based on the residuals. However, it requires some sophisticated statistical skills to build a satisfactory model during the first step. This has motivated us to propose a new procedure of time series model building. If traditionally time series model building is based on autoregressive integrated moving average (ARIMA) models, in this paper we show that a great number of time series data are governed by geometric Brownian motion (GBM) law. If the process is governed by GBM law, the appropriate model is directly derived from the properties of that law. Otherwise, the model is constructed by using the standard practice. An industrial example is presented to illustrate the advantages of the proposed method.

Estimation of Population Generalized Variance: Application in Service Industry

Revathi Sagadavan[1], Maman Abdurachman Djauhari[2], Ismail Mohamad[1]
[1]*Universiti Teknologi Malaysia, Malaysia*
[2]*Universitas Pasundan, Indonesia*

In statistical process control, monitoring process target is as important as process variability. In multivariate setting, the former is more developed than the latter. The most widely used measure of multivariate variability is the so called generalized variance (GV). In order to monitor GV, we need to estimate the population generalized variance and its square. In the literature, those estimates are given based on single sample. Only recently, it has been developed for the case of m independent samples with equal sample size. This motivates us to further develop for the case of m independent samples with unequal sample sizes which is usually encountered in service industry. An example of GV control charting for unequal sample sizes will be presented to illustrate the advantages of this method of estimation in monitoring the quality of service.

Factors Affecting Quality in a Manufacturing Environment for a Non-repairable Product

Rene Lombard, Corro van Waveren, Kai-Ying Chan
University of Pretoria, South Africa

Product quality has become one of the most important factors for consideration by manufacturing environments due to the increasingly competitive global market. This is especially true for organizations manufacturing a non-repairable product as the cost of warranty claims can be financially considerable and cause rapid loss of market share due to loss of customer satisfaction and confidence. This study has therefore set out to identify the factors affecting product quality in a manufacturing environment. Two distinct sets of factors were identified in literature: “Hard” factors are Systems and Processes, Efficiency, Product and Process Complexity and Discipline, whereas “Soft” factors are Long Term Planning, Organizational Culture, Workforce Management and Leadership Support. The study found that Long Term Planning and Organizational Culture had a very significant impact on product quality within an organization manufacturing a non-repairable product whereas the hard factors only had marginal impacts on product quality.

Improving Quality of Operations via Industry-specific Empowerment Antecedents: A Study of the Oil and Gas Industry

Ngozi Onyemeh, Chan Wai Lee
University of Nottingham, Malaysia

This paper presents a model that identifies accountability, responsibility, and choice as high-level determinants of employee psychological empowerment in the oil and gas industry particularly in relation to improving operational quality. Psychological Empowerment is targeted at influencing the hearts and minds of the individual and can only be said to have taken place when the individual truly believes he is empowered. As such, there is a need to promote highly situated human cognition targeted at creating an empowered state of mind leading to the conviction, commitment, and conversion of the personnel to embracing organizational goals, in this case quality. To examine the relationship amongst the dimensions of psychological empowerment, a survey was administered to 239 oil and gas industry personnel in different countries. The results showed personnel in the industry link high empowerment to accountability, responsibility, and choice when investigated with meaningfulness, mindfulness, competence and impact.

Application of Six Sigma in Oil and Gas Industry: Converting Operation Data into Business Value for Process Prediction and Quality Control

Wai Kit Cheng[1], Amir Farid Azman[1], Mohamad Hisham Hamdan[2], Rachel Fran Mansa[3]
[1]*PETRONAS Penapisan (Terengganu) Sdn. Bhd., Malaysia*
[2]*PETRONAS Group Operation Excellence, Malaysia*
[3]*Universiti Malaysia Sabah, Malaysia*

This study is to develop a dynamic prediction tool for daily operation quality control in PETRONAS Kertihâ€™s refinery using Design for Six Sigma (DFSS) methodology. Catalytic reforming process was selected as the case study background where the relationship of operation parameters which influences the coke content deposited on the process catalyst was studied. The prediction model allows future estimation of the coke content on the catalyst and in turn assist in reducing future downtime of the unit, which is very costly for reforming unit in refinery. The related input-output operation data were obtained from the plant and 10 process operation parameters were categorized as key process input variables. Using Response Surface Methodology, dynamic modeling of the coke content was developed for prediction and analysis of the relationship between the coke content and the 10 process inputs. The prediction model passed the 2-sample 2-T Test, hence the prediction model was reliable where there was no statistically difference between the mean in actual and the predicted values.

Mishandled Baggage Problem: Causes and Improvement Suggestions

Imad Alsyouf, Fatima Humaid, Shaima Al Kamali
University of Sharjah, United Arab Emirates

The purpose of this paper is to identify the causes of mishandled baggage and suggest effective solutions. This study is conducted at one of the international airports in UAE, at the baggage handling department. We used a procedure that consists of five phases based on six sigma methodology: Define, Measure, Analyze, Improve and Control. Each phase has several steps using relevant engineering tools. Both qualitative and quantitative data were collected and analyzed. Consequently, four main problems were identified: lack of adequate training, long working shift, conveyor system breakdown, and falling bag. It was possible to identify the critical causes for these problems, suggest relevant solutions and select the most preferred ones. The suggested procedure enables the decision maker to measure the performance with respect to the set target. Thus, it will be possible to handle the challenges and reduce the mishandled baggage problem and improve the performance and competitiveness.

Session	Service Innovation & Management I
Date	10/12/2014
Time	15:30 - 17:00
Room	Caymans 2
Chairs	Vipul Jain, Chien-Liang Kuo

Priority Investment Components of Emotional Intelligence Effective on Marketing with AHP Method

Parissa Tavakoli-Targhi, Yousef Gholipour Kanani
Islamic Azad University, Iran

This study investigates the priority components of emotional intelligence effective on marketing with approach of paired comparison. The data of this research were obtained through the use of a questionnaire which elicits information priority components of emotional intelligence that are effective on marketing in the small and medium enterprises in industrial zones in Iran and assess them with approach of paired comparison. Results indicate that the empathy component is the most important factor.

Workforce Planning for Global Network Delivery Model

Sumit Raut, Kishore Padmanabhan, Muralidharan Somasundhanram, Natarajan Vijayarangan
Tata Consultancy Services Limited, India

A steep competition in IT services and customers' demand for high quality of service makes IT service providers to investigate new ways of delivering services. To gain competitive advantage, TCS proposes Global Network Delivery Model (GNDM) to deliver services seamlessly and uniformly for global customers from multiple locations across India, China, Europe, North America and Latin America. This paper focuses on workforce planning for multiple locations while aiming to meet time-based SLA for each location. A novel workload estimation method is proposed for time-based SLA. Based on workload and time-based SLA, we propose mathematical formulation to determine optimal work-force size for each location and each shift. A real-life IT service process is considered to evaluate the performance of the proposed model. The proposed model is compared with current practice and benefits explained.

CSF in Product Innovation Process: A Comparative Study of Three Malaysian Manufacturing SMEs

Noor Hidayah Abu[1], Baba Md Deros[2], Mohd Fitri Mansor[3]
[1]*Universiti Utara Malaysia, Malaysia*
[2]*Universiti Kebangsaan Malaysia, Malaysia*
[3]*Universiti Malaysia Perlis, Malaysia*

Continues development of new product innovative is an important driver for manufacture to sustain in market place. Success or failures of new product in market place depend very much on how organization implementing pre-development process. However large-scale organizations have received full attention from many researchers with respect to efficient pre-development implementation and practices compared to small and medium enterprises (SMEs). SMEs having different characteristic, strength and weaknesses compared than large organization. In view of that SMEs can't simplified followed and adapted large scale organization practice in development of new product. Specific studies about pre-development process which are concentrating in SMEs are required. Therefore, this study was performed with the main objective to identify critical success factors (CSF) that support successful pre-development process implementation in Malaysian SMEs. To achieve the objective, a qualitative method through interview was conducted with three successful Malaysian food and beverages manufacturing SMEs. The results of the study indicated five critical factors for successful pre-development process implementation in SMEs. There are: clear product strategy, commitment of top management, knowledgeable and skillful project team leader, involvement project team members and involvement of external organization.

Supporting the Cross-disciplinary Development of Product-service Systems Through Model Transformations

Thomas Wolfenstetter, Konstantin Kernschmidt, Christopher Münzberg, Daniel Kammerl, Suparna Goswami, Udo Lindemann, Birgit Vogel-Heuser, Helmut Krcmar
Technische Universität München, Germany

During the development of product-service systems (PSS), various artifacts are modeled by the different involved disciplines, e.g. mechanics, electrics, electronics, software and services. Each of these artifacts represents different aspects of the PSS as a whole. In order to reuse the respective information that are contained in each artifact but which are represented using different ways of modeling, transformations are needed. In this paper we present a methodology how the relevant PSS elements and their attributes can be transformed from one specific language to another one, in order to facilitate the cross-disciplinary use of model-based information during the development process of mechatronic PSS.

Structural Investigation of a Healthcare Value Chain: A Social Network Analysis Approach

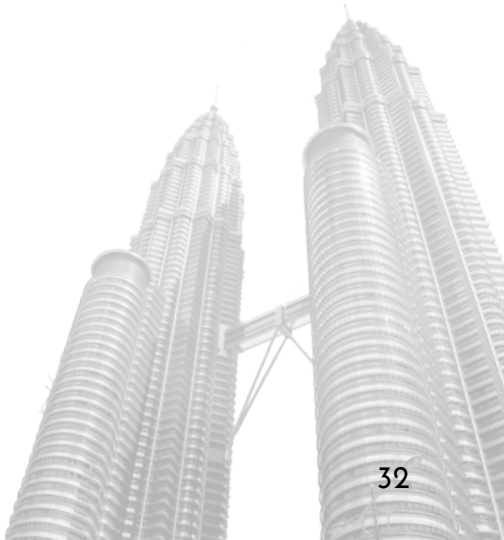
Vipul Jain[1], Sumit Sakhuja[2]
[1]*University of Sharjah, United Arab Emirates*
[2]*Indian Institute of Technology Delhi, India*

Service supply chains consist of peoples and organizations connected in the form of a network. A system of interconnected organizations can be modeled as a network rather than a chain. In this paper a case study on structural investigation of a healthcare value chain has been discussed and important theoretical analysis is presented for an effective decision making. Social network analysis has been used to calculate the various node level and network characteristics of the chain. The node level measures describes the role of each organization in the network whereas, the network level measures helps in interpreting the network structure as a whole. The proposed approach in the paper will provide a pictorial interpretation of a value chain to the managers and healthcare professionals in capturing the dynamics and uncertainties associated with healthcare value networks

Investigating the Effects of Project Scales on the Patterns and Performance of Successfully Funded, Technology-oriented Innovative Crowdfunding Projects

Chien-Liang Kuo[1], C.J.H. Lin[2], S.X.S. Huang[2], Yu-Chen Lin[1]
[1]*Chinese Culture University, Taiwan*
[2]*Ming-Jiang University, China*

Remarkably successful crowd-funded projects have led to crowdfunding (CF) emerging as a novel channel for realizing innovative ideas. The use of CF has therefore attracted both academic and business interest. This study investigated technology- and innovation-oriented CF projects that have successfully received funding from CF platforms in China. The research focused on determining the effects of project scales on CF patterns and outcome. A total of 100 relevant CF projects that completed their funding activities from Demohour.com were analyzed. The results showed that small-sized and medium-to-large-sized CF projects behaved similarly in content provision. Regarding the outcome, although medium-to-large-sized CF projects attracted more browsers than small-sized projects did, they did not outperform the small-sized projects in other observed indicators statistically. Applying the prediction models to the portion of CF funding achievements revealed that the social capital perspective provided stronger explanatory power for successful, small-sized, technology- and innovation-oriented CF projects.



Session	Supply Chain Management I
Date	10/12/2014
Time	13:30 - 15:00
Room	Caymans 3
Chairs	R. Kant, Roger Jiao

Supplier Selection Activities in the Service Sector: A Case Study in Nigeria

Dotun Adebanjo[1], Matthew Tickle[2], Frank Ojadi[3], Petros Ieromonachou[1], Tritos Laosirihongthong[4], Roula Michaelides[2]
[1]*University of Greenwich, United Kingdom*
[2]*University of Liverpool, United Kingdom*
[3]*University of Lagos, Nigeria*
[4]*Thammasat University, Thailand*

This paper presents the results of the supplier selection process conducted by a Nigerian service sector organization. One organization was used as a case study whereby data collection involved an action research approach; the data was then subject to statistical analysis via the SPSS Statistics software package. In total, 185 potential suppliers were assessed. Several statistically significant differences were also found between those suppliers that met the minimum requirements and those that did not as well as between organizations that offered products and organizations that offered services.

Managing Supply Disruption in a Three-tier Supply Chain with Multiple Suppliers and Retailers

Sanjoy Kumar Paul, Ruhul Sarker, Daryl Essam
University of New South Wales, Australia

In this paper, a supply disruption management model is introduced in a three–tier supply chain with multiple suppliers and retailers, where the system may face sudden disruption in its raw material supply. At first, we formulated a mathematical model for ideal conditions and then reformulated it to revise the supply, production and delivery plan after the occurrence of a disruption, for a future period, to recover from the disruption. Here, the objective is to minimize the total cost during the recovery time window while being subject to supply, capacity, demand, and delivery constraints. We have also proposed an efficient heuristic to solve the model and the results have been compared, with another established solution approach, for a good number of randomly generated test problems. The comparison showed the consistent performance of our developed heuristic. This paper also presents some numerical examples to explain the usefulness of the proposed approach.

Collaborative Inventory Distribution Management in a Supply Chain: A Simulation Perspective

Joby George, Nimmy J.S., V. Madhusudanan Pillai
National Institute of Technology Calicut, India

The objective of this paper is to introduce the concept of real time collaboration for inventory distribution management in supply chains using Google spreadsheet. The capability of Google spreadsheet to use for a complex structure of supply chain is demonstrated using simulation for inventory distribution management. To demonstrate the collaboration capabilities for inventory distribution management, a role play game is developed using the Google spreadsheet. The two periodic review policies considered for the simulation are Order Up-To (OUT) and (r, S) where, r is reorder point and S is maximum inventory level. Using these policies a two year simulation is carried which could demonstrate on-line inventory distribution management capability for 15-member 4-echelon divergent supply chain. The 4-member 4-echelon role play game could demonstrate collaborative capabilities of Google spreadsheet for inventory distribution in a supply chain.

In-house Capacity Investment and Outsourcing Under Competition

Tarun Jain, Jishnu Hazra
Indian Institute of Management, India

We analyze a two buyer-one supplier setting. The buyers first simultaneously invest in in-house capacity with the knowledge of the demand distribution only. The demand is then realized after the investments are made. If the demand exceeds the invested capacity then, the balance requirement is sourced by the buyers from a common supplier. The supplier has the option to sell its capacity to an alternate market (where demand is random) and to these two buyers. We determine the equilibrium capacity investments by the two buyers in the presence of a supplier who has an alternate market.

Optimization of Multi-commodities Consumer Supply Chains Part II: Simulation Modeling

Zeinab Haji Hajiabolhasani, Romeo M. Marian, Lee Luong
University of South Australia, Australia

This paper aims to demonstrate a simulation optimization modeling approach to examine the efficiency of a mathematical model in Optimization of Multi-Commodities Consumer Supply Chain (MCCSC)- Modeling. Simulation is one of the most widely used tools in model validation. It enables identifying system's behaviors under different circumstances. To this end, in the present work, a supply chain system simulation model is developed within the context of production-distribution (P-D) decision making. Also, taking into account real-life constraints, an integrated MCCSC case study is created to predict the consequences of variable changes. The performance of the model is then evaluated using Sim Events toolbox in conjunction with Simu link toolbox of MALAB®. Finally, Genetic Algorithms are utilized to minimize the total cost of the entire system.

Identifying Critical Success Factors for Green Supply Chain Management Implementation Using Fuzzy DEMATEL Method

Rakesh Kumar Malviya, Ravi Kant
Sardar Vallabhbhai National Institute of Technology, India

The purpose of this study is to discuss cause and effect relationship between the influential factors and to identify of critical success factors (CSFs) for Green Supply chain management (GSCM) implementation in Indian automobile industries. The combined fuzzy set theory and Decision Making Trial and Evaluation Laboratory (DEMATEL) method is used, to segment the critical factors. This study visualizes the causal relationships through cause and effect diagram. The result of empirical study shows that 5 CSFs are figured out from 12 influencing factors. The finding will help to improve the effectiveness and efficiency for GSCM implementation and also provides an indication to build up an effective GSCM implementation in a stepwise manner.

Warehouse Storage Assignment: The Case Study of a Plastic Bag Manufacturer

Chompoonoot Kasemset, J. Sudphan
Chiang Mai University, Thailand

This study presents the application of storage assignment in warehouse management to the case study of a plastic bag manufacturer located in Thailand. The objective is to evaluate the performance of the two methods: (1) using mathematical model and (2) class-based policy. The studied warehouse had one I/O point with 287 storage units dedicated for 62 products. The results of the mathematical model gave 51,317.45 meters per month as a minimum total traveling distance. The class-based policy gave 55,394.46 meters per month. Currently, non-systematic approach gave 71,921.38 meters per month (reduction from mathematical model and class-based methods were 28.65% and 22.98% respectively). The results from mathematical model is the optimal solution but to implement this policy, information technology such as warehouse system management was recommended to support workers during picking and receiving products.

Session	Manufacturing Systems I
Date	10/12/2014
Time	15:30 - 17:00
Room	Caymans 3
Chairs	Rob Dekkers, Kanagi Kanapathy

Comparing Malaysian and Scottish Firms on Practices for Strategic Capability Management

Rob Dekkers[1], Kanagi Kanapathy[2]
[1]*University of Glasgow, United Kingdom*
[2]*University of Malaya, Malaysia*

The study of practices for Strategic Capacity Management at five Malaysian companies and four Scottish companies shows that the Malaysian manufacturing managers acted more reactive due to pressures by sales and processing orders, whereas the Scottish managers were implementing a manufacturing strategy more â€œindependentlyâ€™. Problems with suppliers, albeit sometimes caused by outsourcing, feature high on the list of challenges in both samples. Alignment of organisational structures and investment in technologies are seen by all as key to aligning the manufacturing strategy with the competitive strategy, though actual investments tend to be happening more in Scottish companies.

The Moderation Effect of the Cultural Dimension "Individualism/Collectivism" on Toyota Way Deployment - A Global Study on Toyota Facilities

Nihal Jayamaha[1], Jurgen Wagner[2], Nigel Grigg[1]
[1]*Massey University, New Zealand*
[2]*Robert Bosch GmbH, Germany*

Organizations all over the word attempt to emulate the Toyota Way (TW)--the heart of Toyota's lean management system--to improve their operational performance. There is a tacit assumption made that the system will produce effective results regardless of the prevailing national culture. However, very little is actually known about how the TW fits within diverse cultures. This paper empirically examines how the national cultural dimension "individualism/collectivism" moderates two constructs of the TW--People Development and Process Improvement--to achieve Toyota's outcomes (TW deployment). The findings, which are based on data collected from a large sample (n = 2138) of Toyota's logistics, sales and marketing employees across 20 countries, supported the hypothesis that individualistic cultures are more results-oriented in process improvements than collectivistic cultures. However, both individualistic and collectivist cultures were found to deploy the TW equally effectively--a finding that has practical and academic implications (i.e. further research).

Assessment of the Teamwork Organization in a Production Plant of a Major German Automobile Manufacturer

Robert Stranzenbach, Philipp M. Przybysz, Susanne Mütze-Niewöhner, Stephan Scheel, Christopher M. Schlick
RWTH Aachen University, Germany

In this article the assessment of work organization (AWO) developed by Frieling et al. was employed to describe and compare different settings under which teamwork occurs. The aim was to find significant differences with respect to teamwork within several shop-floor areas at one plant of a German automotive manufacturer. The original AWO consists of 43 items operationalized in six categories: organizational structure, team-oriented activities/tasks, participation/autonomy, formal team communication, qualification and continuous improvement process. Due to specific conditions in the plant the AWO was adapted and extended. An ANOVA was used to compare the four different shop-floor areas. The results demonstrated significant differences within five of the categories between the four shop-floor areas observed. Only the category formal team communication did not differ among the shop-floor areas.

Modeling Cognitive Network of a Physical System Using Design Knowledge Base

Shah Limon[1], Om Prakash Yadav[1], Bimal Nepal[2]
[1]*North Dakota State University, United States*
[2]*Texas A & M University, United States*

In this work, a framework is presented to semi-automate the development of a cognitive network diagram for complex engineering systems. Each node of a cognitive network represents design parameters, environmental factors, and quality characteristics whereas each arc represents causal relationship between two nodes. The framework is proposed to utilize the existing knowledge base, such as, CAD database, expert inputs, and other sources of information to generate the network diagram. Along with these sources of information, the framework also extracts geometric structure, functional relations, and other engineering inputs from CAD system to model the complex physical system into the cognitive network diagram. Semi-automation of the development of a cognitive network diagram will help to reduce the tedious task of manually developing network diagrams. The purpose of developing the cognitive network model is to simulate the behavior of complex physical systems and generate the failure knowledge. The framework is demonstrated by a case study of fuel injection nozzle.

Theoretical considerations for Make-or-buy Decisions During 'Product Design and Engineering': Three Indian Case Studies

Rob Dekkers
University of Glasgow, United Kingdom

Make-or-buy decisions taken during 'product design and engineering' often happen based on incomplete and inaccurate information but have tremendous effects on the manufacturing function; this is an under-researched topic. Based on three cases in India, the study examines the processes and decision-making for make-or-buy during new product development from three theoretical perspectives: Transaction Cost Economics, Resource-Based View and notion of core competencies (in chronological order of being established). Driven by both strategic intents and experiences with suppliers, these companies resorted to developing in-house capabilities rather than continuation of supply. That finding leads to reflection on the validity of current theoretical propositions and can be traced back to literature on outsourcing that dates back decades.

Lean Transformation Efforts of the Wood Industry in Virginia

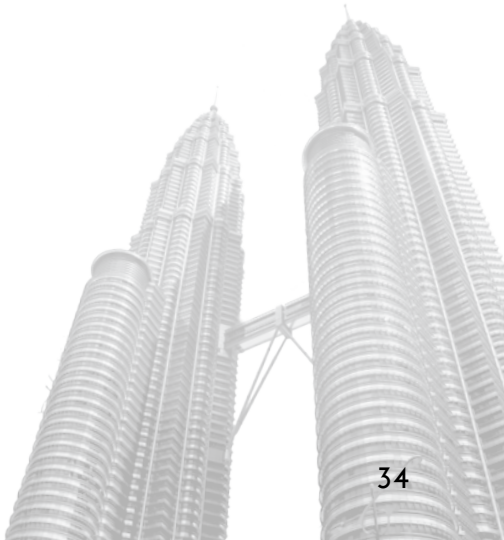
Omar Espinoza[1], Urs Buehlmann[2], C Fricke[3]
[1]*University of Minnesota, United States*
[2]*Virginia Tech, United States*
[3]*Kollmorgen, United States*

This manuscript reports preliminary results from a study examining the status of Lean implementation and the need for Lean transformation support among participants in two segments of Virginia's manufacturing industry. A census survey with 180 responses (population size 1033) was conducted and the results confirm previous research that enterprises in these industries are not uniformly aware of Lean and its potential benefits. Enterprises also have implemented Lean to varying degrees or not at all. Interestingly, small enterprises indicated a lower need for Lean implementation support from third parties than did medium or large enterprises.

Optimal Control Synthesis for a Flexible Manufacturing System Based on Minimal Cuts

Sadok Rezig, Zied Achour, Nidhal Rezg, Mohamed-Ali Kammoun
University of Lorraine, France

This paper deals with supervisory control synthesis of Petri net controller for forbidden state transition problem based on a new utilization of the theory of regions. Two different approaches are proposed to reduce the resolution complexity of the theory of regions by minimizing the total number of equations in its linear system. These two approaches are based on a new concept of minimal cuts in reach ability graph. The supervisor is a Petri net controller for each minimal cut. Moving from one control place to another allows the switch of minimal cuts in the reach ability graph.
These new approaches allows also to determine a Petri net controller when it doesn't exist using the classical approach of the theory of regions. To illustrate the present methods an application is implemented on the Flexible Manufacturing System (FMS) at the ENIM (National school of engineering of Metz) in FRANCE



Session	Technology & Knowledge Management I
Date	10/12/2014
Time	13:30 - 15:00
Room	Caymans 4
Chairs	Atsushi Aoyama, Ching Chieh Kiu

A Behavioral Loyalty Model of Portable Computers

Mohammad Reza Shahriari[1], Ali Hajiha[1], Sara Dehghan[2]
[1]*Islamic Azad University, United Arab Emirates*
[2]*Islamic Azad University, Iran*

With the increasing development of technology, laptop producers have intended to satisfy the customers by providing them new and diverse products, while copying products and introducing new products by competitors have increased the customer expectation level too. So, emphasizing the customer loyalty and preserving them have seemed to be necessary.

In this paper, a model has been used which was presented by Bennett in 2007 for investigating factors affecting Attitudinal and Behavioral Loyalty. Meanwhile, due to the importance of both Brand Trust and Brand Equity variables in Brand Loyalty area, hence, these two variables using Taylor model have been added to Bennett Model.

The results of research showed that the customer satisfaction, brand trust, brand equity and attitudinal loyalty have a positive impact on the behavioral loyalty. Moreover, the impact of Category Involvement on satisfaction and attitudinal loyalty was not approved.

Regionalization of Engineering - Framework and Scenarios

Thomas Schaeffler[1], Rudolf Kodes[1], Michael Gepp[1], Nadja Hoßbach[2], Arndt Lüder[3]
[1]*Siemens AG, Germany*
[2]*Friedrich-Alexander-University Erlangen-Nuremberg, Germany*
[3]*Otto-von-Guericke University, Germany*

Many multi-national technology corporations face the challenge to bring their business closer to their international customers. This paper describes a framework how regionalization of engineering, i.e. the transfer of recurring technical activities, can be effectively instituted. The framework comprises a process model comprising 7 process phases and 20 phase-spanning focal topics which have to be addressed during a regionalization initiative. The process model has been developed based on real regionalization scenarios of a technology corporation. The assessment of these scenarios was based on a morphological analysis and showed that there are four underlying basic cooperation models for regionalization of engineering. They are named “Engineering Supplier, “Engineering Center”, “Engineering Hub” and “Multiple Engineering Hubs”. Regionalization scenarios differ in terms of application rationales and characteristics. The main findings of the assessment of the regionalization scenarios are explained and illustrated in this paper.

The Marketing Strategy for Successful Product Development Performance in Iranian Nanotechnology-based Enterprises

Naser Khosravi, Mohsen Sadeghi
Amirkabir University of Technology, Iran

The emerging market on Nanotechnology and its application makes it inevitable to assess the rate of Iranian enterprise success in attracting consumers to Nano products and develop expedient actions. Emerging market needs to be treated logically based on market needs. As its alluring to capitalize on new product development processes resulting in Nano products, comprehensive attention to suitable marketing strategies for Nano products and public perception of these products is necessary among commercialization issues. Marketing strategies, as a whole, consider markets needs for appropriate product suiting to market, and result in progressive profits for stakeholders. In order to enable Nano firms better deciding to implement which strategy, First, Nano products lifecycle current stage should be defined. Based on type of market and product it can be understood that which strategy is the best. Meanwhile, feedback from consumer warranties successful product development and commercialization process for consumer-commercial products.

Forecasting of Diffusion Pattern: A Case Example of OLED Technology

Pawat Tansurat, Nathasit Gerdsri
Mahidol University, Thailand

Technology changes create an enormous impact to every company. To survive in this fast-changing environment, companies need to find a proper way to manage their technologies and prepare for new technology investment. One crucial issue for technology managers to consider after determining the strategic timing for technology substitution is to know what diffusion pattern of new technology would be. This issue is important as the management of companies can effectively prepare themselves to be ready for upcoming market opportunity.

This paper presents the analysis of the Bass diffusion model to forecast the diffusion pattern of OLED technology in portable devices. The analysis indicates that using p and q value derived from analogous product, cellular telephone, results in realistic diffusion pattern ($p = 0.008$ and, $q = 0.421$). The result reveals that OLED portable device sales start to boost up in 2013 and increase significantly around 2015 - 2017.

Improving Management Practices Upon Organizational Characteristics - An Analysis of Japanese Manufacturing Subsidiaries in Vietnam

Nguyen Thi Duc Nguyen, Atsushi Aoyama
Ritsumeikan University, Japan

Research on cross-cultural technology transfer has addressed the raising attention on various aspects; though, the improving current management practices' performance for achieving the efficient cross-cultural technology transfer still prevails the need. This study focuses on defining which significant management actions for training, commitment, sharing and understanding should be high priority improvement to achieve efficient technology transfer and firm’s business performance. The importance-performance analysis and path analysis in structural equation modeling through SPSS/AMOS 16.0 software are utilized to solve this inquiry. It is found that the improving actions with high priority should be taken in: (a) providing materials, guidelines, formal training courses and OJT in Japan for group having less than 300 employees; (b) committing clear procedures for group of 100% Japanese-owned and less than five operation years; (c) sharing and understanding for group having more than eight experience years in cross-cultural technology transfer; and (d) increasing greatly motivation for further study to efficiently achieve both firm’s innovation capacity and firm’s productivity with transferred technology—for business group having greater than five years.

Identifying Knowledge Components in Software Requirement Elicitation

Laleh Taheri, Noraini Che Pa, Rusli Abdullah, Salfarina Abdullah, Mohammad Yaser Shafazand
University Putra Malaysia, Malaysia

This paper considers the importance of knowledge in software development organizations which are highly knowledge-intensive organizations and focuses on knowledge audit in their requirement elicitation process. Requirement elicitation process involves a great deal of knowledge and there are several problems regarding eliciting and using the knowledge in this process. Misunderstanding, undefined scope, conflicting information and constant changes of requirements are some of the problems of requirement elicitation. A knowledge audit model is proposed in this paper to improve requirement elicitation process by identifying knowledge components and knowledge sources existing in requirement elicitation process as well as their relationships. A survey is also conducted to prove the validity of the model. The results support the proposed knowledge components and knowledge audit model for requirement elicitation.

Session	Information Processing & Engineering I
Date	10/12/2014
Time	15:30 - 17:00
Room	Caymans 4
Chairs	Md. Mamun Habib, Olaf Sauer

A Bayesian Accelerated Degradation Studies on Nitrile Rubber O-ring

Lizhi Wang, Xiaohong Wang, Yuxiang Li, Wenhui Fan
Beihang University, China

To research nitrile rubber O-rings' lifetime with less time and resources, and to reach a more convincing and statistic result, an accelerated degradation testing (ADT) is designed, which consists of a 90C pre-test and a step-stress test with 70C, 80C, 90C and 100C. Compression sets obtained from ADT are analyzed as degradation data, and degradation models were fitted to data using Bayesian method which easily accommodated uncertainties in the test. Then a relationship model between degradation model and temperature was built with support vector machines (SVM), so the step-stress data can be converted to data at 25C and the O-rings' 25C degradation models were obtained. Finally, with these models, nitrile rubber O-rings' lifetimes were studied by Bayesian method, and the lifetime's distribution was obtained, which predicted that the nitrile rubber O-ring will reach 60% compression set by 6.2 years at 25C based on 97.5% confidence bands.

Interview Study: Decisions and Decision Criteria for Development in Industry

Danilo Marcello Schmidt[1], Sebastian Schenkl[2], Eduard Munkhart[2], Susanne Nilsson[3], Markus Mörtl[2]
[1]*Technical University of Munich, Germany*
[2]*Technische Universität München, Germany*
[3]*Royal Institute of Technology, KTH, Sweden*

Decision-making in early stages of product development effects product success essentially. For this reason, professional handling and management of decisions in early development stages is necessary. To investigate the current decision-making in industry, we conducted an interview study to quantify decision criteria, which decision makers from industry base their decisions on. Dependent on a list of decision criteria from literature, several employees from R&D-departments were interviewed and the interviews were analyzed regarding decision criteria. Most important decision criteria are financial, customer requirements and product-technical feasibility. However, interviewees did not mention a few other criteria, which were mentioned in literature.

Theoretical Analysis of RFID Security Protocols

Azam Zavvari, Mohammad Tariqul Islam, Masoud Shakiba, Mandeep Jit Singh
Universiti Kebangsaan Malaysia, Malaysia

Radio Frequency Identification (RFID) is a system that transmits an entity's identity wirelessly using radio waves in the form of a unique serial number. RFID systems are broadly applied in various applications. The remarkable increase in the use of RFID technology has resulted in a number of security and privacy issues. Moreover, most previous security schemes suffer from the lack of a global standard secure communication and the time-consuming computational process of the necessary database activities. This paper focuses on the problems faced by RFID protocols attempting to raise security and privacy. Therefore, several criteria of RFID protocols will be compared and discussed on some chosen security protocols; including conformity to the EPCglobal C1-G2 standard, ability to implement on low-cost tags, anonymity, privacy, tracking, forward security, DoS attack, and impersonation attack.

Analyzing and Visualizing News Trends Over Time

Lubaba Farin Tanisha[1], Bishwajit Banik Pathik[2], Manzur H. Khan[1], Md. Mamun Habib[3]
[1]*American International University-Bangladesh (AIUB), Bangladesh*
[2]*American International University-Bangladesh, Bangladesh*
[3]*Universiti Utara Malaysia (UUM), Malaysia*

NewsVis provides the groundwork for a new kind of visualization to explore the news in a guided and manipulable fashion. With access to a large news data set, the tool provides control over news data by mapping a collection of news based on their similarity and dissimilarity into a two-dimensional space, which illustrates the most similar news in red and the opposite in blue. Thus showing a context the readers have not yet read. The tool applies query string analysis to a collection of text data. The resulting graphs show a total and individual occurrences of given query strings over a selected time period. News holding the selected query strings are also published sequentially as a list in the tool interface. NewsVis helps user to compare occurrences of specific news data, to discover cultural and historical trends and facts, challenge their assumptions to reveal hidden pictures.

A Novel Tool for Reducing Time and Cost at Software Test Estimation: An Use Cases and Functions Based Approach

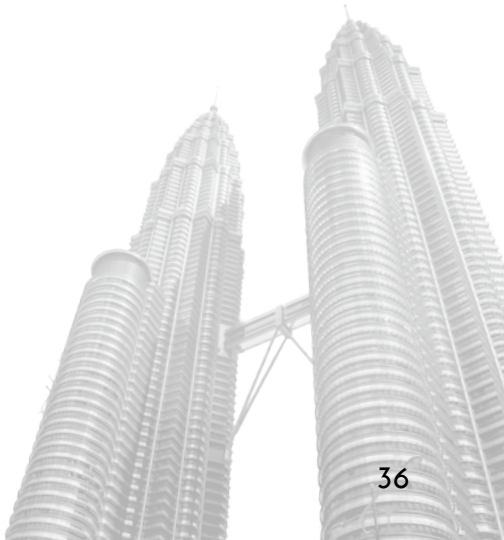
Shaiful Islam[1], Bishwajit Banik Pathik[1], Manzur H. Khan[1], Md. Mamun Habib[2]
[1]*American International University-Bangladesh, Bangladesh*
[2]*Universiti Utara Malaysia (UUM), Malaysia*

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 4 case projects, namely Climate Resilient Ecosystems and Livelihood (CREL), Management Accounts Consolidation System for Line Director (LDMACS), PBI Works Management System Software and Mobile Apps and Human Resources Management System (HRMS), 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.

Self-focusing Appearance in Ultra-compact 3×3 Multimode Interference Coupler Based on Silicon on Insulator

Mehdi Tajaldini[1], Mohd Zubir Mat Jafri[2]
[1]*University Sains Malaysia, Malaysia*
[2]*Universiti Sains Malaysia, Malaysia*

The study of multi mode interference (MMI) couplers in silicon wave guides is limited by the high index contrast, especially when operated in nonlinear regime. In low index contrast, the common method is beam propagation method (BPM) that is based on several algorithms which propose a simple numerical method, but, in nonlinear high index contrast, the modal propagation analysis based on finite difference method (FDM) is a rigorous method, and high index contrast is a super benefit to confine the wave in wave guide in the maximum rate to appearance the self-focusing in highly ultra-compact size. In this paper, we investigate the nonlinear effect in high index contrast structure of silicon on insulator (SIO) 3×3 multimode coupler. Moreover, by simulation of the wave propagation while the input intensities are increasing simultaneously, the appearance of self-focusing are demonstrated. The results show capability of nonlinear modal propagation by FDM numerical solution. Wave propagation in multimode region accomplished with the output electric field indicate the good efficiency for the considered purposes.



Session	Healthcare Systems & Management
Date	10/12/2014
Time	13:30 - 15:00
Room	Jamaica
Chairs	Juha Puustjärvi, Kai-Way Li

Healthcare Platforming for Healthcare Service Development in Hospitals

Linda L. Zhang[1], Michel Aldanondo[2], Arun Kumar[3]
[1]*IESEG School of Management (LEM-CNRS), France*
[2]*Toulouse University-Mines Albi, France*
[3]*RMIT University, Australia*

The platforming concept has been successfully applied to develop diverse customized products in the manufacturing industries, make-to-order (MTO) firms in particular. In view of the need to have structured approaches to developing healthcare services, this study proposes to adopt the platforming concept in service development in hospitals. More specifically, it proposes healthcare platforms. As the initial efforts, this study (1) compares the similarities between hospitals and MTO firms, (2) presents a framework for planning healthcare platforms, and (3) discusses in detail a number of potential avenues for future research on healthcare platforming.

Design of a Dynamic Bi-objective Relief Routing Network in the Earthquake Response Phase

Shadab Shishehgar[1], Reza Tavakkoli-Moghaddam[1], Ali Siadat[2], Mehrdad Mohammadi[1]
[1]*University of Tehran, Iran*
[2]*Arts et Métier Paris Tech, France*

In humanitarian relief operations, especially when a disaster occurs, the transportation of both injured people to the medical centers and relief commodities to the affected area are vital. On the other hand, these disasters usually continue with a secondary disaster (e.g., Aftershocks of an earthquake) which decreases the service level of the affected area due to disruptions in the connection routes. This paper proposes a dynamic bi-objective, multi-commodity, multi-mode relief routing network, in which an inventory is taken into account for each affected area in preliminary periods of an earthquake response to overcome the probable shortages in subsequent periods. The objective functions attempt to simultaneously minimize total transportation and inventory cost and unserved injuries. Finally, a numerical example is solved using GAMS software.

Towards an Instrumented Tissue Expander

Annette Böhmer[1], Alexander Zöllner[2], Ellen Kuhl[2], Udo Lindemann[1]
[1]*Technische Universität München, Germany*
[2]*Stanford University, United States*

Tissue expansion is a surgical procedure to grow additional skin per controlled mechanical stretch. Despite the progress of this reconstructive treatment, there are still some limitations. Both, the inflation protocol and the filling volume vary for every patient. The aim of this paper is to present a first attempt of a sensor featured tissue expander. This so-called instrumented tissue expander provides the treating surgeon a sensory feedback to enhance a successful treatment. The implementation of a pressure sensor enables the display of both, the current expander pressure and the pressure over time. Based on the progress of the pressure curve, the inflation time points are triggered. The skin growth is maximized and adjustable to each individual patient. This new way of tissue expansion is simulated with a finite element model. The skin growth is implemented as a strain-driven process. In addition, a first feasibility prototype is built.
Based on the pressure-time diagram the condition of the skin can be deduced from the first derivative. Additionally the user is always enabled to observe or rather check the current pressure inside the tissue expander. Moreover, the risk of necrosis or pressure-induced ischemia is minimized. Thanks to the technical data the treatment is simplified for less experienced surgeons. Experienced doctors can train less experienced surgeons by monitoring and comparing both the appearance of the skin and the pressure data.

Health System Design: A Financial Perspective

Hans-Jakob Luethi, C. Mandl, Philippe Widmer
ETH Zurich, Switzerland

With prospective payment becoming more common in medical services, measuring the costs of risk is gaining importance. This paper derives a stylized mathematical model which addresses the risk transfer from the insurer to the provider in the Swiss DRG system. Similar to the Value-at-Risk concept in financial industries, we ask how to adjust the premium of the provider or the insurer such that the risk of financial loss is bounded. By focussing on the risk-transfer we are able to understand the basic strategies of risk mitigation for both agents. Results indicate that the two parties are exposed to different risks. The risk exposure of the provider's income is unexpectedly high and strongly depends on its portfolio selection while it remains small for the insurer. General providers offering basic services are likely to make substantial losses whereas specialized health clinics might profit from adverse patient selection.

An Employee Assistance Program by Analyzing the Correlation Between Work Stress and Dreams for Chinese Employees

Kuei-Chen Chiu[1], Tsai-Wei Huang[2], Shulan Hsieh[1]
[1]*National Cheng Kung University, Taiwan*
[2]*National Chiayi University, Taiwan*

This paper provides an employee assistance program to help human resource manager for releasing work stress of their Chinese employees by analyzing the correlation between work stress and dreams in Chinese people. This study verifies the validity and reliability of the proposed questionnaire by SEM, investigates dreams and work stress behaviors of Chinese people by the proposed questionnaire, analyzes the collected data by ANOVA, and Canonical Correlation Analysis, and provides an employee assistance program according to the analysis. The results show that Chinese people have high canonical correlation coefficient between dreams and work stress behaviors. The results show how Chinese people release their work stress in conscious and unconscious ways, which can help human resource managers in counseling on work stress for Chinese employees, consulting clients from work stress, and planning the Employee Assistance Programs.

A Novel Simulated Metamorphosis Algorithm for Homecare Nurse Scheduling

Michael Mutingi[1], Charles Mbohwa[2]
[1]*Namibia University of Science & Technology, Namibia*
[2]*University of Johannesburg, South Africa*

Inspired by the biological concepts of metamorphosis evolution, this paper presents a novel simulated metamorphosis (SM) algorithm for solving the homecare nurse scheduling problem in a fuzzy environment. The algorithm is motivated by the need for interactive, multi-objective, and efficient optimization approaches to solving problems with fuzzy conflicting goals and constraints. The SM goes through initialization, growth, and maturation phases, mimicking the metamorphosis process. Initialization generates a candidate solution which successively goes through growth and maturation loops. Comparative computational tests on benchmark problems show that, when compared to other algorithms, SM is more efficient and effective, producing near-optimal solutions within reasonable computation times.

Education Management in Healthcare Communities

Juha Puustjärvi[1], Leena Puustjärvi[2]
[1]*University of Helsinki, Finland*
[2]*The Pharmacy of Kaivopuisto, Finland*

Building a personal curriculum in continuous education is a challenge as there are several educational institutions that provide various courses, and there are no unified ways the content of the courses is presented. Further, in many organizations it is of high importance that the personal curriculums are in the lines with the skills and competences needed in the organization. In this paper, we describe how a healthcare community can exploit modern ICT technologies in managing continuous education. The corner stone of our solution is our designed Education ontology. It is an integration of the Employee Ontology, Competence ontology, Business Rule ontology, and Learning Object ontology. Such an integrated ontology enables a wide variety of queries that cannot be processed on a single ontology, i.e., we can achieve outcomes that would not be obtainable by functioning independently. In our cloud-based architecture the applications are revolved around the shared Education ontology. Thus anyone with a suitable internet connection and a standard browser can access the applications in the cloud.

Session	Intelligent Systems I
Date	10/12/2014
Time	15:30 - 17:00
Room	Jamaica
Chairs	Gamini Wijayarathna, Dianne Lee-Mei Cheong

Study on the Production Forecasting Based on Grey Neural Network Model in Automotive Industry

Bin Lin, Seng Fat Wong, Weng Ian Ho
University of Macau, Macau

The automotive industry has been dramatically developed these years. However, the whole process of automotive production chain is directly affected by the accuracy of its production forecasting model, such as safety inventory quantity, out of stock losses, and timely performance. Therefore, to improve the accuracy of production forecasting, this paper uses the Chinese automotive industry as a case study, which has been the largest in the world measured by automobile unit production since 2008. It presents three kinds of combined models based on grey neural network, which are parallel grey neural network, series grey neural network, and inlaid grey neural network, compared the single model GM(1,1) and neural network. The experimental results demonstrate that the combined models are higher forecasting accuracy than the single model.

The Need for Integrating Statistical Process Control and Automatic Process Control

Abdul-Wahid A. Saif
King Fahd University of Petroleum & Minerals, Saudi Arabia

Statistical Process Control (SPC) and Automatic Process Control (APC) are two different methods for quality improvement and process adjustment that have been developed in isolation from each other and applied within different industries. SPC minimizes variability by monitoring and eliminating the assignable causes of variation whereas APC achieves the same objective by handling manipulated process variables to keep the process outputs on target. Initially, both methods were considered to be in conflict with each other, until their advocates realized the fact that the techniques being applied were complementary. Consequently, a considerable amount of work has appeared in the literature regarding the joint use of APC and SPC that provided a breakthrough in the field of process control. This paper highlights the developments and the need for the integration of this two techniques Also it highlights the associated issues and possible future directions of research. An example that require the integration of both methods is presented.

Modeling Novices in Decision-problem Structuring for Collective Intelligence

Dianne Lee-Mei Cheong
Universiti Teknologi MARA, Malaysia

Most often, novices do not recognize that they are also responsible for managing their organization's decisions. There are significant gaps in the novices' understanding of how people decide naturally. Novices have limited awareness of useful decision principles. They may not been adequately trained to work in the complex and ambiguous system where conflict arises from cultural differences as well as divergent goals. This study explored how novices structure a decision-problem based on the Management Information System domain. It enabled the modeling to be based on a simple descriptive behavior in problem structuring. The subsequent mathematical model can be nuanced for wider application and appreciation as an aid in problem structuring for collective intelligence. Collective intelligence is primarily seen as a willingness to share and develop potentially useful input from the group.

Survey on Tools and Systems to Generate ER Diagram from System Requirement Specification

Wasana C. Uduwela, Gamini Wijayarathna
University of Kelaniya, Sri Lanka

Lack of Information Communication Technology (ICT) knowledge and the cost have been identified as challenges to Small and Medium Enterprises (SMEs) to adapt ICT. However there are tools and systems freely available to generate information systems automatically, but those require the database structure of the system. Database conceptualization based on the system requirement specification in natural language (SRS-NL) is the most significant landmark in the process of database design. Therefore it is desirable to have a tool, so that the non-technical people in SMEs could use to generate a quality conceptual database model (CDM) based on NL-SRS automatically. Comprehensive literature survey was conducted and evaluated the identified tools by analyzing usability, affordability and quality of the outcomes. Analysis showed that some limitations of the tools which cannot be used by non-technical people in SMEs.

A Methodology for Fuzzy Multi-criteria Decision-making Approach for Scheduling Problems in Robotic Flexible Assembly Cells

Khalid Abd, Kazem Abhary, Romeo M. Marian
University of South Australia, Australia

Multi-criteria decision-making (MCDM) is a method for ranking solutions and finding the best one when the decision maker has two criteria or more. AHP, ELECTRE and TOPSIS are the most popular and acceptable MCDM methods. However, they are not suitable any longer to make decisions when the information is uncertain and vague. Therefore, the purpose of this study is to develop a new approach, using fuzzy MCDM, to deal with multi-objective problems for the dynamic scheduling in robotic flexible assembly cells. The effectiveness of the proposed approach will be demonstrated through a case study in Part II of this paper.

Application of a Fuzzy Multi-criteria Decision-making Approach for Dynamic Scheduling in Robotic Flexible Assembly Cells

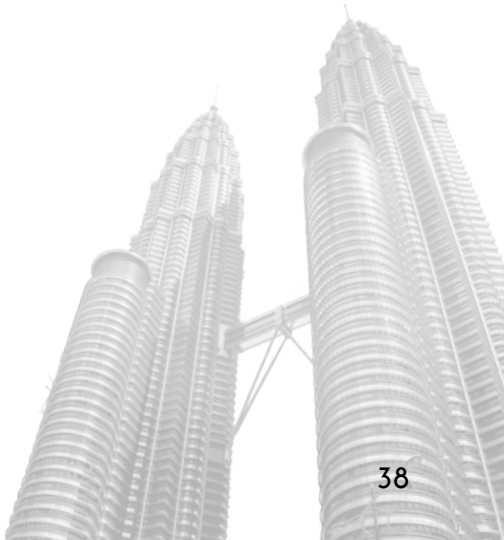
Khalid Abd, Kazem Abhary, Romeo M. Marian
University of South Australia, Australia

This paper is devoted to the application of the developed approach presented in Part I, to demonstrate its capability in tackling real-world MCDM problems. In this paper, a hypothetical case study of robotic flexible assembly cells (RFACs) is considered, to solve multi-objective optimization problems for dynamic scheduling. In order to find the optimal solution, a fuzzy decision support system (FDSS) is applied and built using the fuzzy logic toolbox in MATLAB software. The FDSS combines multi-objective functions in one performance measure named a multiple performance characteristics index (MPCI). The analysis results show that the developed approach is practical, works in RFACs setting, and deal with imprecise and uncertain information.

Overtime Capacity Expansion in Order Acceptance with Node Based Estimation of Distribution Algorithms

Watcharee Wattanapornprom[1], Tieke Li[1], Warin Wattanapornprom[2], Prabhas Chongstitvatana[2]
[1]*University of Science and Technology Beijing, China*
[2]*Chulalongkorn University, Thailand*

Order acceptance with overtime capacity expansion requires trading off between over and under capacity utilization in order to gain more profits. This research proposes an overtime capacity utilization order acceptance model and proposes adaptations of node based estimation of distribution algorithm to solve the order acceptance decisions in multi-process environments. The results show that node based coincidence algorithm is a potential algorithm which can maximize both profit and can maximize the capacity utilization at the same time.



Session	Systems Modeling & Simulation I
Date	10/12/2014
Time	13:30 - 15:00
Room	Kaywest
Chairs	Norani Nordin, Kiyoshi Sawada

Dynamic Modeling and Analysis of LM6000 Gas-turbine Synchronous Generator

Roozbeh Eshraghnia, Randy J. Kleen
General Electric, Power & Water, United States

This paper demonstrates the dynamic performance of synchronous generator in typical LM6000 gas-turbine during sudden changes in input torque and during a short circuit fault at the terminals while it is connected to infinite bus bar based on first engineering principles. The constructed model consists of a set of nonlinear differential equations. The analysis given in this paper is valid for a linear magnetic system where saturation is not considered. In this study, the stator variables are transformed to a reference frame fixed in the rotor. MATLAB is used for analysis and computer traces to illustrate the dynamic behavior of the synchronous generator.

Simulation Based Lean Six Sigma Approach to Reduce Patients Waiting Time in an Outpatient Eye Clinic

Weidong Lin[1], Xianfei Jin[2], Sie Yong Chia[1]
[1]*Temasek Polytechnic, Singapore*
[2]*Integrated Decision Systems Consultancy, Singapore*

This paper describes a simulation based lean six sigma approach to improve the operations in an outpatient eye clinic in Singapore. The concept of the simulation based lean six sigma approach and its application into healthcare industry are examined and illustrated using an example of outpatient eye clinic. The six sigma DMAIC (Define, Measure, Analyze, Improve and Control) phases are adopted to identify opportunities for improvements based on lean tools like Value Stream Mapping. A simulation model is then built for study the systems stochastic behavior during the improvement phase. The experiments based on our model and hypothesis tests are conducted with positive results, showing that the redesigned appointment system is able to reduce patients waiting time by 23.7% in average.

Combining Set-based Concurrent Engineering and Function-Means Modelling to Manage Platform-based Product Family Design

Dag Raudberget, Marcel Michaelis, Hans Johannesson
Chalmers University of Technology, Sweden

The purpose of this work is to present a new design methodology for product platforms that combines Enhanced Function-Means Modelling and Set-Based Concurrent Engineering. The result is the Architectural Option Chart that uses functional couplings between functional requirements and design solutions to eliminate unfeasible platform members

Simulation of New System Departure Terminal Soekarno-Hatta International Airport

Dimas Novrisal[1], Nuraida Wahyuni[2], Nadia Hamani[3], Abderrahman Elmhamedi[4], Tresna Soemardi[5]
[1]*Université de Paris 8, France*
[2]*University of Sultan Ageng Tirtayasa, Indonesia*
[3]*Université de Picardie Jules Verne, France*
[4]*Paris 8 University, France*
[5]*University of Indonesia, Indonesia*

Soekarno-Hatta International Airport (SHIA) has a new system called Grand Design of SHIA. The measurement of current system has been done in previous work. The objective of this research is to measure the performance of the departure terminal in the new system of SHIA and compare it with the current system. Discrete-event simulation method developed to measure the system Pro Model simulator software, from Pro Model Corporation, was utilized to simulate the new system. The results of this system show that it can reduce the passengers' waiting time. To see the reliability of the new system, the authors make some scenarios based on the increasing of passengers between 2015 and 2030. There is a significant difference from 2020 to 2025 in amount of 25% in order to the passengers' average time.

Numerical Simulation of Stress Distribution of a Femur-Menisci-Tibia Bone During Normal Standing, Normal Walking, and Standing with a Cane

Angkhana Prommarat[1], Athassawat Kammanee[2], Thitikom Puapansawat[1], Farida Chamchod[1]
[1]*Mahidol University, Thailand*
[2]*Prince of Songkla University , Thailand*

This paper proposes a mathematical model of stress distribution of a Femur-Menisci-Tibia (F-M-T) bone in three-dimensional spaces of a person with 90kg body weight during normal standing, normal walking, and standing with a cane. Numerical simulation based on the finite element (FE) method is carried out. Our results suggest that the Von Mises stress of menisci during standing with a cane is lowest while the stress during normal standing is highest among three activities. Our study highlights that a cane can reduce the Von Mises stress and help prevent bone damage in a patient.

Statistical Analysis and a Social Network Model Based on the SEIQR Framework

Benjamas Chimmalee, Wannika Sawangthong, Rawee Suwandechochai, Farida Chamchod
Mahidol University, Thailand

Understanding the spread of infectious diseases is an important key to efficiently control them. In this study, a susceptible-exposed-infectious-quarantined recovered (SEIQR) model incorporated with a dynamic social network is proposed to investigate the disease transmission dynamics in the human population and how the number of individual's neighbor (degree of a node), and the longest distance between any two neighboring nodes (the contact radius) influence the number of infectious individuals. Our results indicate that(1) the larger contact radius of an individual node leads to the higher number of infectious individuals (2) the degree of a node has significant effect on individual infection (the higher the degree of the node, the higher the possibility that individuals represented by those nodes spread the disease) and (3) the probability of successful infection can
be estimated as a function of the degree of a node by the binary logistic regression model and we found that it may affect the outbreak period.

Placing a Liaison with Long Communication Lengths to the Same Level in an Organization Structure

Kiyoshi Sawada
University of Marketing and Distribution Sciences, Japan

This study proposes a model of placing a liaison which forms relations to all members in the same level of a pyramid organization structure such that the communication of information between every member in the organization becomes the most efficient. This model considers that lengths between the liaison and the other members are more than those between members except the liaison in the organization. When an added node of liaison gets adjacent to all nodes with the same depth N in a complete binary tree of height H where the lengths of edges between the liaison and the other members are L(1 < L < 2) while those of edges between members except the liaison are 1, we obtained an optimal depth N^*= H which maximizes the total shortening distance which is the sum of shortening lengths of shortest paths between every pair of all nodes in a complete binary tree.

Session	Project Management I
Date	10/12/2014
Time	15:30 - 17:00
Room	Kaywest
Chairs	Linda Zhang, Ramanathan Chidambaram

Setting Up An Intellectual Properties Intermediary Service: DMAIC Way

Kim Siow
Universiti Kebangsaan Malaysia, Malaysia

Intellectual properties intermediary service increases the adoption of technologies within the company by commercializing external intellectual properties i.e. patents. This paper documents a DMAIC like approach to establishing such intellectual properties intermediary services. This paper outlines the different challenges and solutions adopted to overcome the issues encountered during each phase of DMAIC "Define, Measure, Analyse, Improve and Control" in setting up this intermediary service. This paper is expected to serve as a useful reference to parties interested to set up similar intermediary services.

Modular, Building Blocks - Based Approach for Information and Documentation Management in Planning Projects

Daniel Oehme, Ralph Riedel, Egon Müller
Technische Universität Chemnitz, Germany

The management of knowledge and information in projects is decisive – not only for the success of one project but also for knowledge transfer between projects and therefore for the sustainable success of any organization dealing with projects. However, documentation of information and knowledge causes effort that is often not planned and often not available in operative project work. Therefore, we propose a modular approach for information and documentation management in projects which is based on building blocks. Our concept consists of three levels which are elaborated in detail in the paper: a level with generic building blocks, an operational project process level, and a level of operational (software) support. Beyond the content of the concept and its parts we also discuss practical implications and benefits.

Establishing the Development Mechanism of ERP Report

Te- King Chien, Hou-Yi Lin
National Formosa University, Taiwan

Although many scholars and executives had investigated enterprise resource planning (ERP) related issue, but executives need to understand the operating performance of each department and whole enterprise, so requested many customized ERP report. However, due to the industry scope are quite diverse, caused the standard report provided by ERP vendors can't meet the demand of each enterprise. Thus, customized report not only is obstacle for enterprise, but a high pressure for ERP vendors. Therefore, this study reviewing many research results about action research and collaborative design, then apply qualitative research method, to find the critical implementation item and quality control forms, even establish the ERP report design mechanisms. This result pioneers ERP report mechanism in academic, continually improves report quality and dramatically raises overall ERP implementation value in practical.

Multi-objective Optimization and Risk Assessment in System Engineering Project Planning by Ant Colony Algorithm

Pablo Baroso, Thierry Coudert, Eric Villeneuve, Laurent Geneste
University of Toulouse, France

This article addresses the multi-objective optimization in system engineering project planning. At the earliest steps of a system engineering process, many choices can be done taking into account experience feedback. An approach that permits to a decision maker to perform the selection of scenarios during a project is presented. The objectives to optimize are the total cost of the project, its total duration and the global risk. An algorithm based on the Ant Colony Algorithm (ACO) and the Pareto front principles is used. It permits to explore the objective space and to propose to the decision makers Pareto-optimal solutions that are distributed on the Pareto front. The method permits to select solutions (different scenarios for a project) taking into account the risk that a problem arises. The ACO has been developed with the Ruby language and some experiments have been done in order to validate the approach.

Analyzing Implementation of Lean Production Control with the Viable System Model

Fatos Elezi[1], Michael Timo Schmidt[1], Iris Tommelein[2], Udo Lindemann[1]
[1]*Technische Universität München, Germany*
[2]*University of California, United States*

Implementing lean production control systems can pose difficulties at several levels. To overcome incomplete implementation, e.g., caused by unclear description of control structures in an organization, this paper presents an approach for analyzing lean implementations that uses functional abstraction of the control system combined with the Viable System Model (ViSM1) from Management Cybernetics. To illustrate the application of this approach, the control system embedded in the Last Planner® System (LPS) that is used in lean construction is described. The LPS's control structures are identified and mapped to ViSM functions to show the applicability of the cybernetic approach. A case study then illustrates the use of these structures in a LPS implementation. Based on this promising start, the paper concludes with suggestions for further research.

Development of QuicKaizen^TM Technique for Productivity Execution Management for Singapore SMEs

Chin Wei Gan, Ming Hon Toh, Roland Lim, Bin Ma, Puay Siew Tan, Amrik Singh Bhullar
Singapore Institute of Manufacturing Technology, Singapore

Productivity has been identified as a key strategy by the Singapore government to drive economic growth for the next ten years. Limited resources and time constraints make it difficult for Small and Medium Enterprises (SMEs) in Singapore to embark on productivity improvement initiatives above their daily operational activities. Hence, a new technique is needed to boost or expedite productivity initiative implementation. Based on the concepts of Lean, Quick Changeover, Single Minute Exchange of Die (SMED) and methods like Kaizen Event planning, the QuicKaizen^TM technique was developed. This paper explains what the QuicKaizen^TM technique is; its components; and how to use it effectively for productivity execution management. Results show how Singapore SMEs have successfully used the QuicKaizen^TM technique to help them achieve their objectives and deliverables.

The Resource-constrained Project Scheduling Problem with Stochastic Activity Durations

Stefan Creemers
IESEG Management School, France

The Resource-Constrained Project Scheduling Problem (RCPSP) has been widely studied. A fundamental assumption of the RCPSP is that the activity durations are known before their execution. In reality, however, this is almost never the case. In this article, we illustrate why it is important to incorporate activity duration variability and develop an exact model to solve the Stochastic Resource-Constrained Scheduling Problem (SRCPSP). The performance of the model is assessed using a computational experiment. The model is intended for small- to medium sized projects where activities have a moderate- to large level of duration variability.

A Comparative Study Among Stakeholders on Causes of Time Delay in Malaysian Multiple Design and Build Projects

Ramanathan Chidambaram[1], Narayanan Sambu Potty[2]
[1]*Kumpulan Liziz Sdn. Bhd., Malaysia*
[2]*Universiti Teknologi Petronas, Malaysia*

The construction industry plays an important role in developing a nation to a fully developed status. The construction industry, unlike other industries has unique problems concerning project completion. Projects are now more complicated involving huge contract values, participants from multi-discipline, more specialised works, tighter schedule, more cost consciousness, stringent quality standards, etc. Ultimately, cost and time are the two key parameters that play significant role in construction project management. In Malaysia very few studies have been attempted on the factors causing time delay. Besides, there has been no such study related to multiple Design and Build (D&B) projects. The study focused on D&B projects which have complicated risk governed with fixed time and a fixed contract sum (Lump sum). Thus there is a need for comparative study on the risk factors causing this time delay which enables the Malaysian construction to respond proactively and more effectively to time delay factors.

Session	Human Factors I
Date	10/12/2014
Time	13:30 - 15:00
Room	Cancun
Chairs	Peter Kuhlang, Myung Hwan Yun

Enhancing Work System Design and Improvement by Further Developments of Value Stream Mapping

Peter Kuhlang[1], Thomas Edtmayr[2], Alexander Sunk[2], Thomas Mühlbradt[1]
[1]*MTM-Institute, German MTM-Association, Germany*
[2]*Vienna University of Technology, Austria*

The main goal of a company is to conduct target oriented rationalization efforts. Thus, the challenges are, among others, to transparence, to bundle, to adapt, to reinterpret and to develop personal and organizational competencies for systematic and methodic planning, designing and implementing, i.e. giving sustainable improvement of processes and value streams. This article describes the further developments of "Value Stream Mapping" (Value Stream oriented Process Management, Value Stream Mapping and MTM, evaluation of alternative value streams, cost development of value streams by changing input parameters). Existing, implicit knowledge will be explicated and systematically bundled along the value stream from different departments of a company in order to enhance work system design and improvement. The personal and organizational system and method competencies are therefore available to evaluate improvement measures and to perform their target-oriented implementation.

Influence of Human Factors Over Idea Generation: a Qualitative and Quantitative Analysis of an Enterprise of the Graphic Sector in Medellin

Manuela Escobar Sierra, Luz Dinora Vera Acevedo
Universidad Nacional de Colombia, Colombia

The objective of this article is to analyze the influence of human factors on generation of ideas in an enterprise of the graphic sector; the research strategy is the case study; data was recollected through creative techniques, cognitive styles test, quality criteria, participant observation, multimedia resources and interviews; mixed factor design and grounded theory were used for the analysis. This study revealed the importance of creative techniques to stimulate creative thought and human factors (cognition, personality and motivation defined by emotions) in the generation of quality ideas for innovation.

The Effect of Font Size on Typing Performance and Sitting Posture

Haruetai Lohasiriwat, Temsin Wattanapanich, Panmeq Saechan
Chulalongkorn University, Thailand

Working with computer usually required prolonged static sitting. Both static work and awkward posture are well known as the two major ergonomic risk factors in such activity. Workstation arrangement guidelines are usually suggested based on good working posture. In this study, rather than investigating on the physical dimensions of the workstation (i.e., table and chair) like others, we look into the font size factor instead. Our research is separated into two phases. The first phase is to study the effect of font size (8 moa, 12 moa, 16 moa, and 24 moa) and viewing distance on working performance as measured by text-entering speed. Our results show that both factors are not significant (p-value = 0.464 and 0.913 respectively). Then, in the second phase, we look at whether there are tendency of sitting posture change due to the different font size. Our findings show significant difference on neck angle (p-value = 0.007) but not back angle (p-value = 0.314). Our finding suggests that there are more posture deviations under smaller font size conditions.

Improvement of Workstation by Providing Ergonomically Designed Chair and Table for the Water Hyacinth Weaving Department of the Villar Foundation

Devie Ann Gamata, Ralph Orozco, J K. C. Laserna, J. A. Medina, Sheily Mendoza, R J. U. Garcia
University of Perpetual Help System DALTA, Philippines

The Villar foundation is established to provide job opportunities for housewives. Weaving section has the highest number of employee and biggest source of income, that is why the researcher focus on how to improve their working condition by providing them a set of ergonomically design chair and table to decrease their stress and musculoskeletal pain they feel while working and after work; eliminating those will increase their effectiveness when it comes to quantity and quality of their work. The researchers provide Nordic questioners to know the condition of each employee. The researchers also conducted time study to figure out the things needed to be changed and improved in weaving; the following tests prove that there should be an improvement needed to be done.

The Effect of Psychosocial Stress on Trapezius Muscle Activity During Computer Work: A Review

Mohd Firdaus Mohd Taib, Myung Hwan Yun
Seoul National University, South Korea

Psychosocial stress is a common phenomenon in a working world. There are indications that psychosocial stress will increase muscle activity and eventually contribute to musculoskeletal disorders problem. The aim of this review is to identify the effect of psychosocial stress during computer work towards trapezius muscle activity. Another objective is to identify and categorize the task and condition used by previous researchers to induce the stress for future study. A systematic literature search has been conducted and 25 articles have been included in this paper. In conclusion, most of previous study have been recognized the effect of psychosocial stress on trapezius muscle activity during computer work. Besides that, several types of tasks have been recognized to induce stress among subjects.

Parametric Modeling of 3D Human Faces Using Anthropometric Data

Chun-Yang Tseng, I-Jan Wang, Chih-Hsing Chu
National Tsing Hua University, Taiwan

Personalized design is a current trend in the field of consumer products. It aims to enhance the value added by a product or service by satisfying individual customer requirements. This research proposes a design method for mass personalization of eyeglass frames. Three-dimensional (3D) face models of Taiwanese females aged 18 to 25 were constructed using non-contact scanning technologies. Principal Component Analysis (PCA) was applied to reduce data complexity while preserving sufficient data variance. Parametric models based on linear regression and Kriging were developed to correlate the mesh point coordinates of a face model to a set of feature parameters. These models efficiently generate 3D facial geometry approximating to individual users. A design software tool implementing Free Form Deformation (FFD) was introduced to adjust the frame design interactively and to enable real-time design evaluation. This study enhances the practical value of 3D anthropometric data by realizing the concept of human-centric design.

Developing Transfer of Learning Through Reflective Framing and Design Thinking: An Engineering-games Design Approach

Chien-Sing Lee[1], K. Daniel Wong[2]
[1]*Universiti Tunku Abdul Rahman, Malaysia*
[2]*Malaysia University of Science and Technology, Malaysia*

Successful inculcation of lifelong learning dispositions and transfer of learning is critical. We aim to develop these through reflective framing and design thinking. The former helps in reformulating old problems or discovering new ones. The latter leads to the development of general principles, useful in helping learners to search for abstract problem-solving methods and mental schemata, which subsequently, serves as analogy-enhancing transfer between different task situations. An Engineering-Games Design human factors approach is applied as these exemplify the interdisciplinary ecosystem which requires technological problem- solving, and planning abilities from conception to completion. Findings indicate building on prior knowledge, and evidences of micro and macro causal structures, and evidences of near transfer (genres as classes and its instantiation) and far transfer between Web and portfolio design. We hope the findings will help instructors to make more informed decisions as to the design of context, task and assessment for Engineering Education.

Session	Production Planning & Control I
Date	10/12/2014
Time	15:30 - 17:00
Room	Cancun
Chairs	Philipp Baumann, Norbert Trautmann

Process Family Planning: An Optimization-based Approach

Roel Leus[1], Linda L. Zhang[2], Daniel Kowalczyk[1]
[1]*KU Leuven, Belgium*
[2]*IESEG School of Management (LEM-CNRS), France*

This study is aimed at providing companies with decision support in selecting the most suitable production processes for producing diverse customized products belonging to a family, in attempting to achieve production efficiency while utilizing the available manufacturing resources. One of the measurements of "best suitability" is the similarity of production processes for producing product family members. If the production processes are similar, there will be fewer production changeovers. This, in turn, helps achieve not only efficiency but also product quality. We develop an integer linear formulation for the selection of production routings for each member of a product family, and for the assignment of an execution mode to each operation in each selected routing. We report on computational experiments with an illustrative example instance.

Efficient Symmetry-breaking Formulations for Grouping Customer Orders in a Printing Shop

Philipp Baumann, Norbert Trautmann
University of Bern, Switzerland

This paper deals with a real-world printing shop, where the offset-printing technology is used to imprint customer-specific designs on napkin pouches. The optimization problem consists of allocating the designs to the slots of some printing plates such that the given demand for each design is fulfilled at minimum total overproduction and setup costs; thereby, various technological and organizational constraints arising from the production equipment are to be met. We present two alternative mixed-binary linear programming formulations; a structural difference between the two formulations is that they eliminate symmetric solutions explicitly or implicitly, respectively, from the search space. The computational results for a set of problem instances devised from real-world data indicate that both formulations are able to find optimal solutions for small instances in short CPU times. For larger instances, the implicit formulation performs significantly better in terms of average integrality gap and number of instances solved to feasibility.

Continuous Precise Workload Control Method

Hakan Akillioglu, Joao-Dias Ferreira, Antonio Maffei, Pedro Neves, Mauro Onori
Royal Institute of Technology, Sweden

The diversity of requirements and the frequency of change in the market can only be competed with dynamicity and responsiveness in both production and planning systems. In this sense, working principles of a novel workload control method, called continuous precise workload control are presented in this paper. The implementation of the method is based on a multi-agent based architecture. The presented approach generates dynamic non periodic release decisions exploiting real time shop floor information. The performance of the system and correlation of norm value against the assessment range are investigated through an experimented test case.

Economic Level of Detail for Assembly Planning

Achim Kampker, Peter Burggräf, Yvonne Bäumers
RWTH Aachen University, Germany

In order to be competitive, companies have to reduce their production costs and thus their assembly costs with increasing quality requirements. To achieve this, companies plan their assembly processes as detailed as possible. Simultaneously, because of an expending range of products with numerous variants, small batches and shorter product life cycles, the question arises, to what extent the effort of a detailed planning is still justified. In order to confirm the described practical problem and in order to validate first solution hypotheses on the determination of an economical planning depth of the assembly planning, a preliminary study was conducted at the WZL (Laboratory for Machine Tools and Production Engineering) of the RWTH Aachen University. The results of this study are presented in the following paper.

Scheduling a Dynamic Flowshop to Minimize the Mean Absolute Deviation from Distinct Due Dates

Ahmed W. El-Bouri
Sultan Qaboos University, Oman

A dynamic flowshop, where new job orders continuously arrive over the scheduling horizon, is considered in this study. The objective is to minimize the mean deviation from the due dates for the completed jobs. A cooperative dispatching approach is investigated for this objective, and its performance is evaluated by comparison with other dispatching rules. The results from the comparative study indicate that the cooperative dispatching performs generally better than other dispatching rules for problems that are characterized by moderate to low due date tightness levels. In those instances where the jobs have moderately tight due dates, the cooperative dispatching approach produces mean absolute deviations that range between about 7 to 10% lower than the next best performing dispatching rule across varying shop floor congestion levels.

A Hybrid EOQ and Fuzzy Model to Minimize the Material Inventory in Ready Mixed Concrete Plants

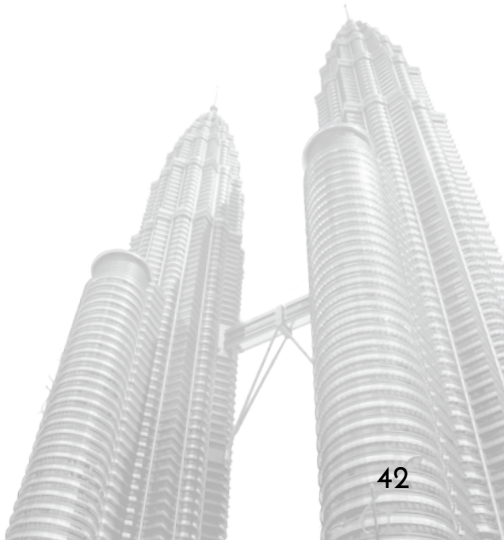
Mehdi Ravanshadnia, Milad Ghanbari
Islamic Azad University, Iran

In almost all countries, a major percentage of the manufactured cement and aggregates is used in Ready-Mixed Concrete (RMC) plants. Therefore a material inventory control system is needed to form a consumption pattern for this material to optimize warehousing cost and ordering in RMC plants. Such a material inventory control system of batching plants could be applied as an approach for optimal estimation of the tanks required for storage and feeding of material. In this research, a material inventory control system of batching plants has been developed by Fuzzy Logic (FL) with Economic Order Quantity (EOQ) model of inventory control. The optimal order quantity of raw materials in batching plant can be predicted with fuzzy logic.

A Structural Equation Model Linking Forecasting, Planning and Controlling with SME Performance

Biju Puthanveettil[1], Bhasi Marath[2]
[1]*Rajiv Gandhi Institute of Technology, India*
[2]*Cochin University of Science and Technology, India*

The importance and influence of forecasting, planning and controlling on SME performance are analyzed in this paper. A structural equation model is formed and is tested with a questionnaire survey data, administered among the selected SMEs in India. Forecasting is found the most influencing variable followed by planning and then controlling. The compensating role of planning and controlling on firm performance, when the forecasting is inactive is also revealed. The cross validation explains the distinct pattern of use of forecasting, planning and controlling among the SMEs managed by the professional managers and the conventional owners. The case study discussed in this paper confirms the model based study. The paper suggests the ways for improving the use of forecasting, planning, controlling and firm performance. This model is useful to the researchers for improving the existing models.



Session	Decision Analysis & Methods III
Date	11/12/2014
Time	11:00 - 12:30
Room	Casablanca
Chairs	Rajasvaran Logeswaran, Elita Amrina

Design for Open Innovation (DfOI) - Product Structure Planning for Open Innovation Toolkits

Maik Holle, Udo Lindemann
Technische Universitaet Muenchen, Germany

The Design for Open Innovation (DfOI) approach presented in this paper shall support developers while defining suitable product structures for the successful utilization of web-based open innovation toolkits. In this context, it is first of all necessary to analyze company-specific, customer specific, product specific and toolkit specific boundary conditions which have influence on the product structure planning and the resultant area of tension. Subsequently, possible conflicts within this area have to be identified. Based on this, guidelines for defining suitable product structures during early phases of product development have to be derived. Against this background, the DfOI approach shall show how to deal with conflicting boundary conditions related to the product structure planning and how to find an acceptable compromise.

Effects of Different Classifiers in Detecting Infectious Regions in Chest Radiographs

Wan Siti Halimatul Munirah Wan Ahmad[1], Rajasvaran Logeswaran[2], Mohammad Faizal Ahmad Fauzi[1], Wan Mimi Diyana Wan Zaki[3]
[1]*Multimedia University, Malaysia*
[2]*Nilai University, Malaysia*
[3]*Universiti Kebangsaan Malaysia, Malaysia*

This paper presents the effects of different types of classifiers when analysing the normal and infectious regions in chest radiographs. Three types of classifiers are experimented on: Rule-based, Bayesian and k-nearest neighbour's. The evaluation is based on a few criteria, namely, the classification accuracy, misclassification (error), speed, Kappa statistic, ROC area, and other performance measures specifically the true and false positive rates, and precision and recall. The dataset consists of image features from a total of 102 chest radiographs. The normal and infectious lung regions are extracted and divided into non-overlapping sub-blocks prior to the image feature computation. The quantitative results are presented and discussed for consideration in further analysis of infectious lungs.

Parallelization of Industrial Process Control Program Based on the Technique of Differential Evolution Using Multi-threading

Rajeev Agrawal[1], Abhinav Goyal[1], Debjani Sambasivam[2], Arya K Bhattacharya[3]
[1]*Birla Institute of Technology, Mesra, India*
[2]*Tata Steel, India*
[3]*Mahindra Ecole Central, India*

Differential Evolution is a population based optimization technique which discretizes the sample space of solution based on generations of population members and performs a fitness evaluation to determine the best population members. The fitness evaluation process involves lengthy calculations, thus becoming the most redundant and time consuming aspect of the program. The aim of the proposed work is to parallelize an industrial process control program which is based on differential evolution. The parallelization of program has been carried out using a multi-threading approach, in which the independent iterations of the fitness evaluation of Differential Evolution have been distributed uniformly into separate worker threads, which are then simultaneously executed on a multi core architecture GPU machine. By parallelizing the fitness evaluation of the program over the population members in a particular generation, a speed up of 3.99 times in the overall execution time has been observed.

Weibull Component Reliability Evaluation With Masked Data

Jieqiong Miao, Xiaogang Li, Renxi Luo
Beihang University, China

Under the condition that the exact component causing system failure is masked in life testing, a new method is proposed to evaluate the reliability of Weibull component in a series system. Considering relaxing the symmetry assumption of masking probability, we obtained the likelihood function of the Weibull components on the basis of the masking probability does not depend on the distribution parameters. A latent variable is introduced to rewrite the form of the likelihood function, and we obtain the estimators of the unknown parameters. The confidence intervals of Weibull component life-distribution parameter are also inferred with likelihood ratio method. The approach is illustrated with a simple numerical example.

An Extension of PROMETHEE to Divisive Hierarchical Multicriteria Clustering

Yves De Smet
Université libre de Bruxelles, Belgium

We consider an extension of PROMETHEE II for multicriteria ordered clustering. The method is based on a divisive hierarchical clustering algorithm. A new property of the net flow score is proved and then used to divide existing clusters. The method is illustrated on two applications: the ranking of management masters by the financial times and the human development index.

Effectiveness Assessment for Waste Management Decision-support in the Arctic Drilling

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

The technological advances, new concepts and the ranges of possible waste management solutions in the Arctic drilling pose their own peculiar demands and affects the waste management decision making process. Thus, it is become imperative to evalute the assessment methods for their efffectiveness, to support strategic decision. The aim of this paper is to propose steps for evaluating the available assessment method for their effectiveness. The proposed steps can help to assess the assurance of the stringent waste discharge requirements in the region (such as zero hazardous discharge to the sea). By employing the proposed steps the suitable waste management decision-support tool can be recommended.

Session	Decision Analysis & Methods IV
Date	11/12/2014
Time	13:30 - 15:00
Room	Casablanca
Chairs	Rudra P Pradhan, Hossam Ismail

Real-time Decision Support System for Resource Optimization & Management of Threat Evaluation and Weapon Assignment Engineering in Air Defence

Afshan Naseem, Shoab Ahmed Khan, Asad Waqar Malik
National University of Sciences & Technology, Pakistan

Strategic decision making in real time environment of air defence is a crucial activity. With threat evaluation and available resources, the problem concerns the assessment and management of optimal solution to achieve favourable results with uncertainties, constraints and other requirements. Optimal use of resources is highly desirable in air defence system. Based on the multi-attributes decision, threat perception, threat evaluation and availability of resources/weapons, the paper presents a decision support system that provides the optimal solution of problems. At first, with the establishment of threat index system and optimal scheduling of available resources, strategic decision is made by high command. Although a substantial attention has been given by scientific community to address this issue by proposing sophisticated optimization models, but very limited literature available to understand the potential of threat assessment and weapon assignment. This paper identifies the core parameters that can affect the Decision Support System (DSS) and use mathematical notations to present DSS as time critical system rely on efficient scheduling of resources. The paper concludes that on the basis of proposed DSS, optimal solution can be developed for effective emergency management in air defence.

An Approach to Analyse Key Renewable Energy Technologies: A Case from Sri Lanka

Amila Withanaarachchi, Julian Nanayakkara, Chamli Pushpakumara
University of Kelaniya, Sri Lanka

Though Sri Lanka has the highest potential to self-sufficient with renewable energy as of year 2012 more than 70% of country's electricity requirements were met with imported fossil fuels. Most of the renewable energy technology options have been analysed based on technical grounds. But studies indicate that numbers of social, technological, economic, environmental and political factors are also hindering the sector's development. Accordingly, the objective of the paper is to analyse the renewable energy technologies on non-technical grounds. The analysis was conducted in four phases. First expert selection, second a list of renewable energy technologies were shortlisted, third initial list of technologies were prioritized based on two variables, and finally key renewable energy technologies were selected. The results indicate that wind and biomass based electricity generation are the two promising renewable energy technologies. However substantial policy assist is a must for both sectors to operate in large scale.

Bibliometric Methodology to Detect Collaborative and Competitive Countries

Shino Iwami[1], Francisco Tacoa[1], Junichiro Mori[1], Yuya Kajikawa[2], Ichiro Sakata[1]
[1]*The University of Tokyo, Japan*
[2]*Tokyo Institute of Technology, Japan*

Analyses by countries are in high demand, because many policy-makers and business-planners think by country. We are providing the system of citation network analysis, and we strengthen analyses by countries in this work. So, user will be able to easily extract country's keywords and compare text-based similarity and number of international co-authors between countries. These new functions would unveil relations between countries. The purpose of this work is to establish a methodology to detect potential collaborative and competitive countries in science and technology, comparing text-based similarity and number of international co-authors. In this work, we focused on analysis about Japan as an example, and we could pick up several implicit relations which have potential to grow collaborative or competitive relations.

Fuzzy Decision Making in Shape Feature Design for Product Development

Ching-Hu Yang[1], Chung-Shing Wang[1], Chin-Fu Chen[1], P.Y. Lin[1], Chung-Chuan Wang[2]
[1]*Tung-Hai University, Taiwan*
[2]*Chung-Chou University of Science and Technology, Taiwan*

In this study, a platform for the product shape design is constructed based on fuzzy decision making for shape feature in portable electronic instruments. First, the research summarized shape features of electronic instruments and analyzed rules from the concept of shape grammar. Second, the research utilized fuzzy algorithms, including analyzing the weight of shape features by Fuzzy Analytic Hierarchy Process (FAHP), exploring the relationship between customer demand in shape features and rules of shape grammar (technical requirements) by Fuzzy Quality Functional Deployment (FQFD), estimating the inferential results by the Fuzzy Synthetic Evaluation Model (FSEM) that made the decision making platform was built considerately for a pressure meter. Flash ActionScript was used as the programming tool for building the platform in shape feature design. Two portable pressure meters are proposed compared with the existed meter as the implementation for proving the research process.

An ANP-based Multi Criteria Decision Making Model for Supplier Selection

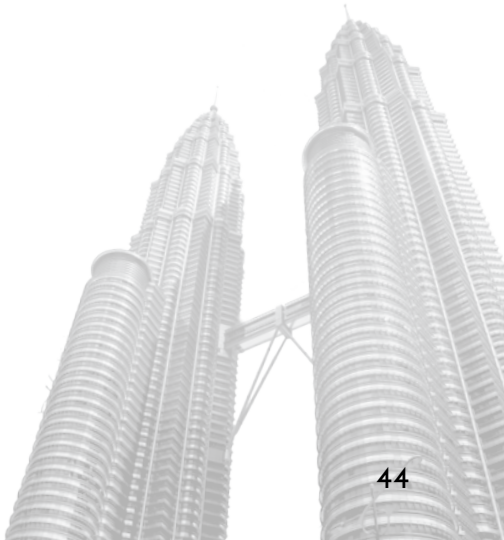
Hisham Alidrisi
King Abdulaziz University, Saudi Arabia

The issue of supplier selection represents one of the hot topics in the industrial literature. Several practices within various industries are considered as a reflection of the process of supplier selection. In this paper, the technique of the Analytic Network Process (ANP) is presented to show how such a tool can be employed to handle this issue. The case of one of the Middle Eastern electricity companies is discussed. The results indicate that "Financial Stability" is the most important criterion for supplier selection.

Multi-granules Evaluation Model Through Fuzzy Random Regression Analysis

Nureize Arbaiy
University Tun Hussein Onn Malaysia, Malaysia

Various approaches and models are introduced to facilitate better information extraction and decision making. Granular computation is one of the approaches which provide ability to extract granules information. Granule and levels are connected by using relationship and further forms information granule model. Besides that, dealing with data containing fuzzy and random characteristic is complicated in some way though this kind of data are exist in real world application and requires proper handling. Thus, a fuzzy random based regression is introduced to improve the extraction of weight of granules in building a multi-granular decision making scheme. The proposed model organize decision or preference provided by evaluators in order to compute collective assessments about the product samples that will be used by the decision maker to determine final decision. A numerical example shows the usability of the model and presents the advantage of the proposed method.



Session	Decision Analysis & Methods V
Date	11/12/2014
Time	15:30 - 17:00
Room	Casablanca
Chairs	Ali Siadat, Abdel-Aziz M. Mohamed

A Case Study on Mining Social Media Data

Hing Kai Chan[1], Ewelina Lacka[2], Rachel W. Y. Yee[3], Ming K. Lim[4]
[1]*University of Nottingham China, China*
[2]*University of Strathclyde, United Kingdom*
[3]*Hong Kong Polytechnic University, Hong Kong SAR*
[4]*University of Derby, United Kingdom*

In recent years, usage of social media websites have been soaring. This trend not only limits to personal but corporate web-sites. The latter platforms contain an enormous amount of data posted by customers or users. Without a surprise, the data in corporate social media web-sites are normally link to the products or services provided by the companies. Therefore, the data can be utilized for the sake of companies' benefits. For example, operations management research and practice with the objective to make decisions on product and process design. Nevertheless, little has been done in this area. In this connection, this paper presents a case study to showcase how social media data can be exploited. A structured approach is proposed which involves the analysis of social media comments and a statistical cluster analysis to identify the inter-relationships among important factors.

Understanding Sustainability in Healthcare Systems: A Systems Thinking Perspective

Michael Mutingi[1], Charles Mbohwa[2]
[1]*Namibia University of Science & Technology, Namibia*
[2]*University of Johannesburg, South Africa*

Healthcare systems are often confronted with problems of scarce resources and the ever-increasing demand. As a result, healthcare organizations always seek to ensure sustainable satisfaction of the society's health status, the employee's expectations, as well as the organizational objectives. While patient satisfaction is known to be a crucial factor in the social component of healthcare sustainability, employee satisfaction (job satisfaction), and organizational effectiveness (satisfaction) are important; fulfilment of the patient, the employee, and the management is essential. However, there are complex factors behind the three major players in the healthcare system. A balanced, holistic systems view is therefore necessary to ensure sustainable quality of life and business survivability and growth. By viewing the healthcare system as a system of systems, we propose a systems thinking approach to analyze individual and overall satisfaction, together with the pertinent factors and their relationships within the healthcare system. We suggest a set of satisfaction indices defined in terms of the perceived satisfaction of the three players in a complex healthcare system.

Mitigating the Effort for Engineering Changes in Product Development Using a Fuzzy Expert System

Tobias Kindsmüller, Florian G. H Behncke, Benjamin Stahl, Klaus Diepold, Martina Wickel, Daniel Kammerl, Konstantin Kernschmidt
Technische Universität München, Germany

The timing of testing the maturity of a product within the product development process challenges manufacturing firms. This paper presents an approach to identify the timing to be checked for differences between the as-is-state and anticipated to-be-state of the development. Therefore, a model is established to simulate a product development process by using a fuzzy-expert system.Using this model, an optimization is performed to ascertain an ideal timing.

Information Communications Technology (ICT) Infrastructure Impact on Stock Market- Growth Nexus: The Panel VAR Model

Rudra P Pradhan
Indian Institute of Technology Kharagpur, India

This paper examines the mutual relationship between information communication technology (ICT) infrastructure, stock market depth, and economic growth in the selected Asian countries for the period between 1961 and 2012. The ICT infrastructure (such as telephone main lines, mobile phones, internet users, internet servers and fixed broadband) are assessed and by a composite index with the help of principal component analysis (PCA). Our results revealed that there is a long-run equilibrium relationship between the three variables. We then used a panel vector auto-regression (VAR) model to reveal the nature of Granger causality among the three variables. As expected, the results depict the feedback relationships between ICT infrastructure, economic growth and stock market development.

A Mathematical Formulation for Low Carbon Electricity Planning in the Presence of Technology and Policy Interventions

Amrutha Appiyah, Muthu Mathirajan, Balachandra Patil
Indian Institute of Science, India

To address climate change and resource related constraints, there is a need for integrating Renewable Energy (RE) along with conventional nonrenewable sources to achieve a low carbon electricity system. But in many instances, there is insufficient renewable energy capacity installed in the system. For optimally matching the supply-demand in an electricity utility with numerous supply-side management (SSM) alternatives of electricity generation, we explore various RE technology interventions along with RPO (Renewable Purchase Obligation) and REC (Renewable Energy Certificate) policy interventions. For solving this problem, a Linear Programming (LP) model to obtain an optimal mix of supply, and minimum cost and emission is developed. A LINGO set code is developed to generate the LP model for any given data. The proposed model is validated using the data obtained from Karnataka Electricity System.

Five Factors That Make Pervasive Business Intelligence a Winning Wager

Riccardo Cognini, Flavio Corradini, Alberto Polzonetti, Barbara Re
University of Camerino, Italy

Evidence of the competitive value of business intelligence (BI) and analytics solutions is growing. Fact-based decision making is spreading throughout commercial, nonprofit, and public sector organizations. The economic downturn is spurring organizations to examine ways of retaining customers, spending capital and operating budgets, and complying with regulations. However, over the long term, BI solutions will continue to be applied to optimize a wide array of processes in an effort to improve performance management and organizational competitiveness.

An increasing number of organizations are making BI and analytics functionality more broadly available to all decision makers inside and outside the organization. Internally, more pervasively available BI solutions lead to greater accountability by all employees and greater consistency in performance management. Externally, relationships with supplier and partners can be strengthened through effective sharing of key performance indicators (KPIs). However, having pervasive BI means more than having the appropriate BI tools distributed to all stakeholders. In pursuit of pervasive BI, organizations should focus on the five key factors that can be directly influenced to increase diffusion of BI.

These factors have to do as much with BI and analytics technology as they do with the related professional services for BI strategy and solution development, deployment, and maintenance.

A New Hesitant Fuzzy Analytical Hierarchy Process Method for Decision-making Problems Under Uncertainty

S. M. Mousavi[1], Hossein Gitinavard[2], Ali Siadat[3]
[1]*Shahed University, Iran*
[2]*Iran University of Science and Technology, Iran*
[3]*Arts et Métier Paris Tech, France*

Hesitant fuzzy set is a useful and powerful tool for dealing with uncertainty and hesitant situations. This concept helps experts or decision makers so that they specify their evaluations under a set. In this paper, we present the hesitant fuzzy sets for the analytical hierarchy process (AHP) method. For convenience, we call the proposed method as HF-AHP. In the process of proposed method, decision makers' evaluations for comparison matrices are expressed by linguistic variables and then DMs' judgments are aggregated the by utilizing the hesitant fuzzy geometric operator. Finally, the performance of the proposed HF-AHP method is illustrated for the selection of the most appropriate bridge construction problem from the recent literature. Computational results and the comparative analysis demonstrate that the presented method can be used for multi-level evaluation process to assist decision makers for better judgment in selecting the best alternative.

Session	Operations Research III
Date	11/12/2014
Time	09:00 - 10:30
Room	Caymans 1
Chairs	Konstantinos Kirytopoulos, Shieu-Hong Lin

A New DEA Model for Six Sigma Project Selecting: Case Study on Esfahan Province Electricity Distribution Co (EPEDC)

Ali Yousefi, Amir Reza Aqamohammadi
Esfahan Province Electricity Distribution Company, Iran

The first step to reduce the risk of failure in six sigma projects is selecting optimal ones which have the most profits and the least expected risks. The main objective (question) of the current research is inspecting that if DEA is a suitable technique for selecting six sigma projects. To meet the objective, we introduce a new DEA (Data Envelopment Analysis) model to select six sigma projects. Then, we employ LDA (Linear Discriminant Analysis) to examine results validity of the proposed DEA model. A real application in electricity distribution industry is demonstrated. Base on Our findings, DEA ranking is strongly confirmed by LDA technique; hence, DEA is a proper model to select six sigma projects.

Vehicle Routing Problem for Hazardous Materials Transportation: An Overview.

Khaoula Hamdi[1], Nacima Labadie[2], Alice Yalaoui[2]
[1]*King Saud University, Saudi Arabia*
[2]*University of Technology of Troyes, France*

Lately, Vehicle Routing Problems (VRP) related to risk management are attracting much interest. Providing safe transportation services is becoming of crucial importance especially in some sensitive fields. In this paper, a literature review of studies involving VRP in Hazardous Materials (Hazmat) transportation is addressed.

Electricity System Sustainability Transitions : An Integrated Methodology

Tarun Sharma, Patil Balachandra
Indian Institute of Science, India

The electricity system transition into a sustainable state depends on several factors–energy resource and technology choices, economic and environmental targets, human and social development needs. To achieve such a transition, the policy makers need to know how sustainability of the electricity system is affected by these factors and to make optimal choices of technology, resource, size, location, etc. There are synergies and tradeoffs amongst these choices. We first discuss a multi-dimensional and hierarchical framework to assess the sustainability of electricity system. Secondly, we propose an optimization based modelling framework to integrate the macro model of national electricity system sustainability with the bottom-up reference electricity system. This is being done with multi attribute technology characterization across entire electricity supply chain. We elaborate how our approach explicitly captures the synergies and the tradeoffs among investment decisions, and can be used to prioritize optimal technology solutions for electricity system sustainability transition.

Multi-project Flexible Resource Profiles Project Scheduling with Ant Colony Optimization

Elena Rokou[1], Manos Dermitzakis[1], Konstantinos Kirytopoulos[2]
[1]*National Technical University of Athens, Greece*
[2]*University of South Australia, Australia*

In today's rapidly evolving management world, the scheduling of multiple projects where each one's execution depends on another's successful completion, is of great importance. This paper presents a hybrid meta heuristic algorithm composed of an external Genetic Algorithm (GA) and an encapsulated Ant Colony Optimization (ACO) algorithm for the flexible resource constrained multi-project scheduling problem (MPFRCPSP). The proposed idea is grounded on the concept of prioritizing the sub-projects' scheduling based on: a) the number of external (to other sub-projects) relations and b) the resource requirements as compared to the resource shortage for each resource type and each sub project. The implementation uses the Genetic Algorithm to deal with the classification and prioritization of the projects to be scheduled and the inner ACO algorithm, to perform the activity list optimization for each project. The proposed method was validated using a consistent number of PSP Lib[1] data sets.

An Efficient Solution Framework for a Large Scale Delivery Problem

Suyan Teng[1], Edmund Chan[1], Changjun Yang[1], Mingyen Yu[1], Siow Hwei Tan[2]
[1]*Republic Polytechnic, Singapore*
[2]*ST Logistics Pte. Ltd, Singapore*

In this paper, we propose a three-stage solution framework to address a large scale delivery problem consisting of about 1400 delivery points with an aim to improving delivery efficiency and reducing total delivery cost. The problem was first decomposed into a number of smaller sub-problems through a clustering method based on Binary Integer Programing (BIP) model. Then delivery routes were formed within each cluster to reduce delivery cost while satisfying various constraints. Lastly, due to the feature of the delivery problem, delivery routes were assigned to vehicles based on a Bin Packing Problem which again was formulated as a BIP model. Computational results show that the prosed framework can provide an efficient and cost effective delivery plan for the large scale delivery problem.

Second Order-response Surface Model for the Automated Parameter Tuning Problem

Aldy Gunawan, Hoong Chuin Lau
Singapore Management University, Singapore

Several automated parameter tuning procedures/configurators have been proposed in order to find the best parameter setting for a target algorithm. These configurators can generally be classified into model-free and model-based approaches. We introduce a recent approach which is based on the hybridization of both approaches. It combines the Design of Experiments (DOE) and Response Surface Methodology (RSM) with prevailing model-free techniques. DOE is mainly used for determining the importance of parameters. A First Order-RSM is initially employed to define the promising region for the important parameters. A Second Order-RSM is then built to approximate the center point as well as the final promising ranges of parameter values. We show how our approach can be embedded with existing model-free techniques, namely ParamILS and Randomized Convex Search, to tune target algorithms and demonstrate that our proposed methodology leads to improvements in terms of the quality of the solutions compared against the earlier work.

Session	Operations Research IV
Date	11/12/2014
Time	11:00 - 12:30
Room	Caymans 1
Chairs	Tatsushi Nishi, Sha'ri Mohd Yusof

A Bootstrap Data Envelopment Analysis (BDEA) Approach in Islamic Banking Sector: A Method to Strengthen Efficiency Measurement

Shahsuzan Zakaria[1], Mad Ithnin Salleh[2], Shamsuriati Hasan[3]
[1]*Victoria University, Australia*
[2]*Sultan Idris Education University, Malaysia*
[3]*A.Z.E Groups, Malaysia*

This study applied the Bootstrapping Data Envelopment Analysis (BDEA) approach to investigate the efficiency level of twelve Islamic banks in Malaysia. BDEA approach has been employed to resolve the uncertainty issue of traditional DEA measurement practice as well as small sample problem. The empirical analysis showed that in measuring Islamic banks' efficiency, there is a bias issue that BDEA approach has been able to trace, thereby providing more accurate and reliable efficiency results. We believe that this approach, not only is important for a more precise efficiency measurement but also compatible with Islamic banking concepts that differ substantially in objectives and operations from those of conventional banks. In general, this study has contributed to the efficiency study literature where the issue of accuracy and bias in examining efficiency level is crucial. Finally, this study also provided specific guidelines for banks to be more efficient and, therefore, achieves a competitive advantage in the banking sector.

A Rule-based Heuristic Procedure for the Container Pre-marshalling Problem

Mohamed Gheith[1], Amr B. Eltawil[2], Nermine Harraz[3]
[1]*Egypt-Japan University of Science and Technology, Egypt*
[2]*Egypt - Japan University of Science and Technology (E-JUST), Egypt*
[3]*Alexandria University, Egypt*

In container terminals, containers are stacked in the yard for further operations; either loading these containers to vessels or trucks. These containers have different priorities determined by many factors such as destination container terminal, and the weight of the container, and they are stacked randomly in the yard configuring an initial layout of a bay. If it is required to pick up a target container that is placed beneath to another container, extra movements should be made in order to pick up the target container. The objective of the container pre-marshalling problem is to convert an initial layout of a bay into final desired layout that is compatible with the loading schedule of this bay with minimum number of container movements. In this paper a rule-based heuristic procedure method is introduced and experimented against benchmark instances, and the results show the advantage of this method

Operational Excellence Frameworks - Case Studies and Applicability to SMEs in Singapore

Amrik Singh Bhullar, Chin Wei Gan, Andy Ang, Bin Ma, Roland Lim, Ming Hon Toh
Singapore Institute of Manufacturing Technology, Singapore

Singapore is positioning itself as a key operational excellence hub in Asia for manufacturing in order to compete with other neighbouring developing countries with advantages such as lower costs of production. Hence, there is clearly a need for an Operational Excellence Framework for companies in Singapore to be able to assess their capability level in terms of operations. This paper presents a study of existing frameworks such as The Shingo Model, LESAT, CMMI and SQA, analyzing the strengths and weaknesses and concluding with the key barriers of adoption for Small and Medium Enterprises (SMEs) in Singapore. Results point to a gap between what is currently available and what SMEs require, suggesting a need to develop a customized simple yet effective Operational Excellence Framework and assessment toolkit specifically for SMEs in Singapore.

A Mathematical Model and a GRASP Metaheuristic for a Faculty-course Assignment Problem for a University in Saudi Arabia

Khaoula Hamdi
King Saud University, Saudi Arabia

This paper presents a faculty-course assignment problem that concerns an academic institution is Saudi Arabia. Rich constraints are considered while assigning the teaching load to faculty members as well as other academic tasks. Preferences, conflicts, antecedents and special institution constraints are considered. The overall objective is to maximize faculty satisfaction and load equity among faculty. A mathematical model and a GRASP metaheuristic are proposed for the problem. An application example is provided.

Multi-objective Vehicle Refueling Planning Using Mixed Integer Programming

Shieu-Hong Lin
Biola University, United States

For point-to-point direct delivery over the transportation network, timely delivery of commodity and reduction of total fuel cost are both important objectives to consider. Since fuel prices can vary significantly over a broad region, often there is a trade off between fuel cost and travel time. A short path may not be economical in terms of fuel cost while routing through areas with lower fuel prices may take more time. In this paper, we address multi-objective refueling optimization problems in the context of two priority models regarding fuel cost and travel time. Unlike the shortest path problem, optimal refueling paths may not be simple paths, which complicates the setup of mixed integer programs. We first start with arbitrage-free vehicle refueling planning that restricts refueling paths to simple paths in the network only. We then show how we can augment the mixed integer formulation for vehicle refueling planning without the arbitrage-free assumption.

Solving the Toll Optimization Problem by a Heuristic Algorithm Based Upon Sensitivity Analysis

Vyacheslav Kalashnikov[1], Nataliya Kalashnykova[2], Roberto Carlos Herrera-Maldonado[1]
[1]*Tecnológico de Monterrey (ITESM), Mexico*
[2]*Autonomous University of Nuevo León, Mexico*

An important problem concerning the toll roads is the setting of appropriate costs for driving along paid arcs of a transportation network. Our paper treats this problem as a bilevel programming model. At the upper level, decisions are made by a public regulator/private company that administers the toll roads endeavoring to elevate their benefits. At the lower level, several transportation companies/individual users appease the existing demand for transportation of goods or passengers while selecting the routes that would minimize their total travel costs.

Aiming to find a solution to the bilevel programming problem, a plain method based on sensitivity analysis is brought forward. In order to "jump" (if necessary) from a local maximum of the upper level objective function to a vicinity of another, the "filled function" move is applied.

The proposed algorithms are genuine and work efficiently enough when employed to solve small- and medium-sized test numerical problems.

Session	Global Manufacturing & Engineering
Date	11/12/2014
Time	13:30 - 15:00
Room	Caymans 1
Chairs	Xun Xu, Roger Jiao

Drivers and Barriers in Sustainable Manufacturing Implementation in Malaysian Manufacturing Firms

Norani Nordin, Hasbullah Ashari, Mohamad Ghozali Hassan
Universiti Utara Malaysia, Malaysia

Sustainable manufacturing practices seek to optimize production efficiency while minimizing environmental impact. Nowadays, the implementation of sustainable manufacturing practices in companies has increased. By implementing sustainable manufacturing practices, firms can gain better access to international markets; enhance business profile, consumer perceptions and corporate reputation and increase the manufacturing capacity. However, the implementation of sustainable manufacturing practices is posed to many drivers and barriers in light of the benefits manufacturing firms stand to gain from this initiative. This paper aims to investigate the drivers and barriers of sustainable manufacturing implementation in Malaysia. In this study, data were collected by using a self-administered questionnaires. The result shows that the increment in the overall cost of implementation is regarded as the main barrier to implementing sustainable manufacturing practices while environmental regulation and top management commitment are regarded as the main drivers. This research has been able to highlight the important barriers and drivers of implementing sustainable manufacturing practices through which industries can improve the manufacturing practices to offset the negativity on the environment.

Choose Whom to Date Wisely: Explaining the Performance Variation in Strategic Alliances

Mait Rungi, Valeria Stulova
Tallinn University of Technology, Estonia

In the current dynamic and fast-paced business environment, it is impossible to be successful alone. Companies form strategic alliances to pool resources and join endeavors. However, partner choice is a crucial determinant of alliance success. This paper explores the role of alliance characteristics, absorptive capacity and environmental turbulence on three distinct facets of innovative performance within alliances. The results demonstrate that the most beneficial collaboration structure is the one involving partners from different activities and also countries. The results of an alliance are further enhanced by continuous development mindset of alliance partners as well as are boosted by environmental dynamism.

Smart Factories in Industry 4.0: A Review of the Concept and of Energy Management Approached in Production Based on the Internet of Things Paradigm

Fadi Shrouf[1], Joaquin Ordieres[2], Giovanni Miragliotta[1]
[1]*Politecnico di Milano, Italy*
[2]*Universidad Politécnica de Madrid, Spain*

The real and the virtual worlds are growing speedily and closely to form the Internet of Things (IoT). In fact, IoT has stimulated the factories and the governments to launch an evolutionary journey toward the fourth industrial revolution called Industry 4.0. Industrial production of the new era will be highly flexible in production volume and customization, extensive integration between customers, companies, and suppliers, and above all sustainable. Reviewing and analyzing the current initiatives and related studies of the smart factories/Industry 4.0, this paper presents a reference architecture for IoT-based smart factories, defines the main characteristics of such factories with a focus on the sustainability perspectives. And then it proposes an approach for energy management in smart factories based on the IoT paradigm: a guideline and expected benefits are discussed and presented.

Application of Lean Manufacturing in Mass Production System: A Case Study in Indian Manufacturing Unit

Mahadevan Kishore Kumar, A. John Rajan, R. Kaja Bantha Navas, S. Sahaya Rubinson
Sathyabama University, India

In the present competitive and challenging market, industries need to improve their performance by concentrating on their manufacturing processes. Lean manufacturing is one of the most powerful manufacturing control systems backed by several tools for improving quality, productivity and profitability, for eliminating waste and for improving process flow. Lean manufacturing can also help in environmental pollution control, cutting down the product cost, reducing physical effort and minimizing product manufacturing time. This paper illustrates the application of lean manufacturing to minimize the setup time, cycle time of a reputed manufacturing industry in India. A detailed description of each step of the process is given and is illustrated the results from a case study undertaken during the research. This article focuses on lean manufacturing tools like value stream mapping, method study, and its implementation. It will decrease the current lead time by fifty percent. It also proposes and comes out with measures to improve current operations within the company.

Simultaneous Configuration of Product Families and Supply Chains for Mass Customization Using Leader-follower Game Theory

Dong Yang[1], Roger J. Jiao[2]
[1]*Donghua University, China*
[2]*Georgia Institute of Technology, United States*

With the manufacturer with mass customization paradigm extending its scope into global manufacturing network, module-based product family configuration and supply chain design should be simultaneously considered. This paper formulates joint optimization of product family and supply chain configuration as a leader-flower Stackelberg game. Product family configuration is modeled as a upper level problem (leader) with the selections of product variants, modules and module instances as decision factors, while the supply chain, as a lower level problem (follower), determines the configuration of supply chain networks in terms of the decisions from the upper level. A nonlinear, mixed integer programming model is built for the bi-level joint optimization. The genetic algorithm is developed to solve the leader-follower bi-level game. A case study of a power transformer product family is reported to demonstrate the effectiveness of the proposed method.

Session	Operations Research V
Date	11/12/2014
Time	15:30 - 17:00
Room	Caymans 1
Chairs	Vyacheslav Kalashnikov, Stefan Creemers

Management of the Care Activities in Home Health Care Services: the Routing and Scheduling of Caregivers Level

Rabeh Redjem[1], Eric Marcon[2], Xiaolan XIE[3]
[1]*Paris 8 University, France*
[2]*Saint Etienne University, France*
[3]*Ecole des mines de Saint Etienne, France*

The Home Care Services (HCS) provide continuous and coordinated health cares at the patient's home. This paper addresses the problem of routing and scheduling of caregivers of a HCS under precedence and coordination constraints. Indeed, each patient may be visited many caregivers per day. Each visit is provided by a different caregiver. Moreover, visits should not be performed simultaneously and sometimes in a pre-defined order. Two mixed integer programming (MILP) models are proposed, based respectively on TSP (Traveling Salesman Problem) and RCPSP (Resources Constrained Project Scheduling Problem). Numerical results allow, in one side to define the axes of complexity for this problem. In another side, the results allow us to define the context of efficiency of each model.

Optimal Cost Drivers in Activity Based Costing Based on Artificial Neural Network

Noppadol Amdee[1], Kawin Sonthipermpoon[2], Thongchai Arunchai[3], Phanboonmee Warawut[4]
[1]*Muban Chombueng Rajabhat University, Thailand*
[2]*Naresuan University, Thailand*
[3]*Rajamangala University of Technology Suvarnabhumi, Thailand*
[4]*UK Engineering & Supply Co.,Ltd., Thailand*

This study focuses on the development of Activity Based Costing (ABC) system by using optimal cost drivers (OCD) for the Thai automotive parts industry. Recently, traditional cost accounting (TCA) has been used to calculate production costs. However, the difficulty of TCA appears in the indirect or overhead costs which can be considered as a distortion production cost. Although the factory used the ABC system, inappropriate methods were utilized in order to solve this problem. The selected cost driver may not be the only factor affecting production costs. However, it was found that using OCD in ABC calculation resulted in more accurate production costs. The estimated production cost using artificial neural networks (ANNs) as a tool for identifying optimal production costs, because this method is effective for resolving both linear and non-linear problems. ANNs are designed and tested to estimate production costs by using the input and output data in the activities and production costs, and utilize a multi-layered feed forward and a back-propagation. The testing results of the production cost and the estimated cost for product A were applied to ABC by OCD in December, 2013. The production cost, estimated cost and mean square error (MSE) are equal to 47.337, 47.282 Thai baht, and 0.000036017, respectively.

Icing and Performance of Offshore Production Facilities in Cold Climate Region

Rezgar Zaki, Abbas Barabadi
The University of Tromsø - The Arctic University of Norway, Norway

Ice accretion affect performability of offshore production facilities in various ways, including repair time and failure rate. Moreover, it can increase the power losses, life cycle costs and safety hazards. There are few studies and systematically collected information about the impact of ice accretion on performability and its concepts (reliability, maintainability, quality, safety and sustainability) for Arctic offshore production facilities. This paper will discuss the effects of different types of ice accretion on the performability of Arctic offshore production facilities. Then, to quantify their effect on the production facilities´ performability, an icing performability index is developed.

Petri Net Representation for 0-1 Integer Programming Problems

Akito Kodama, Tatsushi Nishi
Osaka University, Japan

Petri net is a mathematical modeling tool that represents wide variety of discrete event systems. Given an initial marking and final marking for a Petri net, an optimal firing sequence problem is defined as the problem to find an optimal transition sequence to minimize the objective function. For the purpose of analysis of 0-1 integer programming problems, we propose a general algorithm to convert general 0-1 integer programming problem into an optimal firing sequence problem of Petri net. By utilizing the proposed algorithm, general 0-1 integer programming problems can be visualized and analyzed by Petri net theory. The property of solutions derived by solving the original 0-1 integer programming and the optimal firing sequence problem is discussed. The solution of 0-1 integer programming problem and that of the optimal firing sequence problem of Petri net are compared. The results show that the solutions for both problems are identical for traveling salesman problem and vehicle routing problems.

Algorithms for the Min-max Regret Generalized Assignment Problem with Interval Data

Wei Wu[1], Manuel Iori[2], Silvano Martello[3], Mutsunori Yagiura[1]
[1]*Nagoya University, Japan*
[2]*University of Modena and Reggio Emilia, Italy*
[3]*University of Bologna, Italy*

Many real life optimization problems do not have accurate estimates of the problem parameters at the optimization phase. For this reason, the min-max regret criteria are widely used to obtain robust solutions. In this paper we consider the generalized assignment problem (GAP) with min-max regret criterion under interval costs. We show that the decision version of this problem is Σ^{p}_2-complete. We present two heuristic methods: a fixed-scenario approach and a dual substitution algorithm. For the fixed-scenario approach, we show that solving the classical GAP under a median-cost scenario leads to a solution of the min-max regret GAP whose objective function value is within twice the optimal value. We also propose exact algorithms, including a Benders' decomposition approach and branch-and-cut methods which incorporate various methodologies, including Lagrangian relaxation and variable fixing. The resulting Lagrangian-based branch-and-cut algorithm performs satisfactorily on benchmark instances.

Network Optimization for Capturing and Transporting CO2

Ho-Yoeng Yun[1], Lianxi Bai[1], Kyung-Sup Kim[1], Suk-Jae Jeong[2]
[1]*Yonsei University, South Korea*
[2]*Kwangwoon University, South Korea*

For solving the problem of climate change caused by greenhouse gases, researches and measures of reducing greenhouse gass emissions have been proposed widely around the world. Reduing CO2-the most prominent grrenhouse gas contributing to global warming, is the major project for each country. CCS, the major mean to avoid the CO2 emission from using of fossil fuels, is an effective thechnology that captures CO2 and transports it to an sequestration isolate CO2 from the atmosphere. According to the active CCS projects in progresses, typical CCS pipline transportation network is that transport the captured CO2 from CO2 sources to sequestration directly, which has disadvantage in trems of cost affect. Therefore, in our search, we proposed a new CCS pipeline network that by adding CO2 storage site, generates sources-CO2 storage site-sequestration network using Harmony Search Algorithm to find the optimal solution. A real-life case study in South Korea with 22 emissions cources and three sequeatrations is provided.

Laboratory Measurement: Chlorophyll-a Concentration Measurement with Acetone Method Using Spectrophotometer

Fairooz Johan, Mohd Zubir Mat Jafri, Hwee San Lim, Wan Maznah Wan Omar
Universiti Sains Malaysia, Malaysia

Chlorophyll-a is an important factor in photosynthesis of microalgae. The concentration of chlorophyll-a in microalgae can be used to analyse and investigate the density and biomass of microalgae in the ecosystem. This is because microalgae are primary producer in the food web in freshwater and ocean. Thus, an accurate estimate of chlorophyll-a concentration in microalgae is very significant. In this study, the samples of microalgae were collected from Tasik Harapan and Tasik Aman, USM Penang, Malaysia. The samples were tested using 90% acetone method by using spectrophotometer (model HITACHI U-1900) to record the absorbance values with selected wavelengths namely 750 nm, 664 nm, 647 nm, and 630 nm The results showed that the chlorophyll-a concentration in microalgae increased when the absorbance was increased. The chlorophyll-a concentration in microalgae depended on several factors such as amount of sunlight available, total phosphorus (TP), water flow, light, catchment area, water depth, weather, and other physical factors. This study determined the value of chlorophyll-a concentration in microalgae collected from Tasik Harapan and Tasik Aman, USM Penang. The highest and the lowest chlorophyll-a concentration were recorded in this study. The spectrophotometer with 90% acetone method successfully determined the maximum and minimum sensitivity of chlorophyll-a concentration within the wavelengths tested.

Session	Quality Control & Management IV
Date	11/12/2014
Time	09:00 - 10:30
Room	Caymans 2
Chairs	David Tchoffa, Diego Tlapa

Comparative Analysis of Taguchi's Crossed Array Approach vs Combined Array Approach to Robust Parameter Design: A Study Based on Apparel Industry

Pramila Gamage[1], Nihal Jayamaha[1], Nigel Grigg[1], Manjula Nanayakkara[2]
[1]*Massey University, New Zealand*
[2]*University of Peradeniya, Sri Lanka*

This research compares Taguchi's crossed array approach with the combined array approach (an alternative proposed by statisticians) using an experiment designed to optimize the sewing conditions to minimize the variability of a high end women's garment. The optimum settings given by the two approaches were similar, although the combined array approach provided more information about the process with a slightly better parameter setting. The findings imply that the benefit an apparel organization gets in conducting a statistically sophisticated analysis needs to be carefully weighed against the statistical simplicity Taguchi's crossed array approach offers in robust parameter designs.

Total Quality Management in Product Life Cycle

Dinh Son Nguyen
Danang University of Science and Technology, The University of Danang, Viet Nam

Today, the development of science and information technology supports engineering product designer to solve the more and more complex and difficult requirements of clients for product. The quality assurance of designed product during its life cycle plays a very important role in the context of global and concurrent economy. Many different parts of the final product are manufactured from raw material, different places and manufacturing processes. The designed product runs the risk of being unsatisfactory to requirements of clients. Thus, this paper proposes a method that allows managing the quality of product during its life cycle at design stage.

Fuzzy Mean and Range Control Charts for Monitoring Fuzzy Quality Characteristics: A Case Study in Food Industries Using Chicken Nugget

S. Mojtaba Zabihinpour, M. K. A. Ariffin, S. H. Tang, A. S. Azfanizam, Omid Boyer
Universiti Putra Malaysia, Malaysia

Organizations must improve or at least maintain the quality of their products to be competitive in today's market. Thus, developing a new approach which could utilize more information from the production process has become an inevitable quality improvement program for each organization. In current study, a fuzzy mean and range control charts were developed to monitor the production process. Fuzzy control charts could handle the uncertainty due to vagueness, ambiguity and/or incomplete information in addition to the inherent uncertainty due to randomness in quality characteristic measurements. The proposed fuzzy control charts were validated through a case study at the chicken nugget production company by collecting data from the factory floor and comparing it to the traditional Shewhart control charts which have been already applied by the factory for monitoring the process. The results reveal that the proposed fuzzy control charts could detect abnormal shifts in the production process more accurately than the traditional Shewhart control charts, as they had used more information from the process. The proposed approach has several benefits for the company by improving the quality and increasing the productivity.

One Hotelling T2 Chart Based on Transformed Data for Simultaneous Monitoring the Frequency and Magnitude of an Event

Yuan Cheng[1], Amitava Mukherjee[2]
[1]*City University of Hong Kong, Hong Kong SAR*
[2]*Indian Institute of Management Udaipur, India*

Commonly, the event frequency and event magnitude have the dependence feature. However, previous research about event monitoring always assume they are independent variables. This assumption is not reasonable in most real applications. Taken the dependence feature into consideration, we introduce a typical bivariate gamma distribution with certain dependence structure. Based on this distribution, a kind of Hotelling's T2 chart based on the transformed data is constructed for jointly monitoring of the shifts in the frequency and the magnitude of an event. An illustrative example based on a real data is provided to show the implementation of this chart. With Monte Carlo simulation, the performance of this proposed chart is studied.

Quality Operating of Information Systems and Service Level Agreement

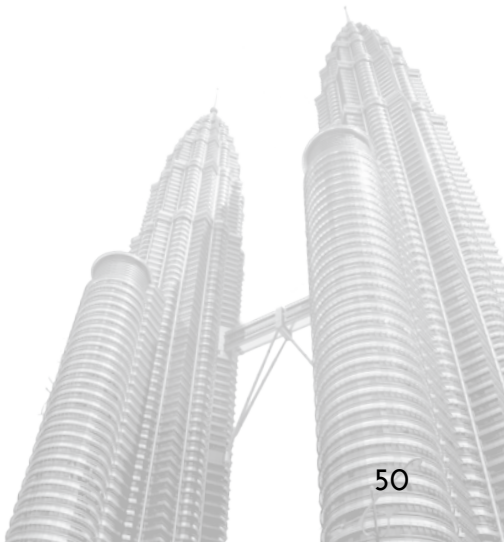
David Tchoffa[1], El Mouloudi Dafaoui[1], Abderrahman Elmhamedi[1], Luminita Duta[2]
[1]*Paris 8 University, France*
[2]*Valahia University, Romania*

ISO 9126 defines the quality of software features and sub features, and presents itself as a model of international consensus. There are two features of computer applications in operations that deserve our attention: the availability and the response time. In our research, we limit ourselves to the unavailability. The purpose of this paper is to show that, to better manage the unavailability of an Information System, one must implement a Service Level Agreement (SLA) with a good system of measurement of Performance Indicators. A good definition of performance indicators is needed and a good method of measurement also. The control of unavailability depends on the method used for statistical process. It seems to be the cheaper and easiest way to stabilize the system and to obtain a lasting satisfaction of the end customer.

Drilling Waste Minimization in the Barents Sea

Rezgar Zaki, Abbas Barabadi
The University of Tromsø - The Arctic University of Norway, Norway

With the increasing demand for energy over recent decades, Arctic region has become an interesting area for future exploration and development. The Arctic region has a harsh and sensitive environment at a remote location. Hence, effective handling and management of wastes is becoming essential to ensure fulfillment of health, safety, environmental, and quality requirements in the Barents Sea. In this paper the available technologies and methods which can be used to minimize the drilling waste will be reviewed.



Session	Service Innovation & Management II
Date	11/12/2014
Time	11:00 - 12:30
Room	Caymans 2
Chairs	Carman Ka Man Lee, Ahmed Abdelgawad

Influence of Task Characteristics on Team Performance

Philipp M. Przybysz, Sönke Duckwitz, Christopher M. Schlick
RWTH Aachen University, Germany

Although many models of team performance acknowledge the importance of task characteristics and their effects on team outcome, task characteristics have often been neglected in empirical research. Instead, the focus has been on variables regarding internal team processes such as coherence, motivation or coordination and team composition variables. In this paper the effects of task characteristics and team characteristics on team outcome are evaluated empirically. A total of 21 teams participated in a laboratory experiment. Teams were designed as either age homogeneous or age heterogeneous groups while task characteristics were accounted for by requirements. Task requirements differed according to diverse needs within stages of the innovation process. This was implemented using two tasks which are approximations of the different challenges within an innovation process. The results show that both, task characteristics and team composition, have significant effects on the outcome of team performance. The evaluation allows an analysis of the impact of team and task factors on service productivity across the whole chain of value creation e.g. within a complex engineering service setting.

Multi-screen Services Adoption and Use-diffusion: The BEST Model Perspective

Hung Chih Lai, Yao Cheng Yu, Yi-Min Tuan, Hui Shan Kuo
iNSIGHT Center, National Taiwan University, Taiwan

The second screen or the multi screen is a hot issue in media and telecom industry, but using it is a new use behavior to the audience so that those incumbent TV companies still don't know how to hold this tech/service. The Second screen or multi screen is also called over the top (OTT) service threatening the present TV ecosystem. Following last-year academia-industry cooperation to deepen research methodology- the BEST model, the research has been trying to dig how users adopt the multi-screen service through persona, TAM3 and Use-Diffusion this year. It's the first time that qualitative and quantitative methods are putted into the BEST model, and we expect these findings will help telcos and other companies related the multi-screen service know what the keys of adoption are and how to grow up the market.

Effects of the Electromobility on Rescue Service Provisions

Francoise Meyer, Alexander Rannacher, Sönke Duckwitz
RWTH Aachen University, Germany

Nowadays, in Germany, persons being involved in an accident can rely on quick and effective help by rescue service providers. In the future more and more electric vehicles will take part in road traffic. In case of an accident these vehicles pose new challenges on rescue services, for example due to damaged lithium-ion batteries. In this paper a cross-institutional process model, which maps a representative rescue service provision, is compiled using the modeling language C3. This model forms the basis for the derivation of the new requirements due to electromobility. Initial needs of adjustments are identified.

TRIZ Based Approach to Improve Public Bus Service Quality

Christina Wirawan, Astrid Ayu
Maranatha Christian University, Indonesia

Theory of Inventive Problem Solving (TRIZ) is a method that support innovative and creative solution in designing product. This research try to combine TRIZ with SERVQUAL, Kano, Fault Tree Analysis (FTA) and Failure Mode Effect Analysis (FMEA) to find systematic innovative and creative improvement for service quality in service industry. TRIZ used to solve contradictions occur in service quality improvement identified by FTA and FMEA. As case study, DAMRI is taken. Perum DAMRI is public bus transportation company in Bandung managed by Indonesian Government as Badan Usaha Milik Negara (BUMN) DAMRI charge relatively cheap cost, but have no good image because of poor service quality. Earlier research have been done by Ayu to identify factors to improve service quality using SERVQUAL measurement, Kano, FTA and FMEA. It's found that there are several poor service quality causes that must be improved, nevertheless several attributes contradict each other that troublesome improvement effort.

Design and Development Waste Management System in Hong Kong

Carman Ka Man Lee, Trevor Wu
The Hong Kong Polytechnic University, Hong Kong SAR

Effective waste management is crucial for a metropolitan like Hong Kong and the latest technology such as RFID and data mining technique can help to provide a sustainable waste management by analyzing the waste disposal habit. In order to have an integrated information system, the purpose of this paper is to adopt NFC and cloud computing technology to develop a web-based system and mobile app for supporting waste management. A prototype system with ubiquitous technology is being designed and a pilot test of the RFID-based waste management system was launched in Homantin Student Hall of The Hong Kong Polytechnic University and the results showed that this RFID-based waste management system improved the recycling rate. The significance of the paper is to provide a novel approach by incorporating RFID and mobile app technology for waste management and it can arouse the public awareness about the importance of waste sorting for recycling and waste minimization.

Maximizing Service Value: A Case Study of Online Hotel Reservation

Napaporn Rianthong[1], Aussadavut Dumrongsiri[1], Youji Kohda[2]
[1]*Thammasat University, Thailand*
[2]*Japan Advanced Institute of Science and Technology, Japan*

This research studies the customer behavior in an online hotel reservation in which a hotel differentiates the same room service with different sale conditions: (i) Restriction Condition, (ii) Mild Condition, (iii) Last Minute Condition. Customers face uncertainty about their plan, and they are charged with cancellation fee. Customer utility is developed and demand function is derived. Then, the optimal prices for different conditions are determined to maximize hotel profit, and achieve customer saving. From numerical experiment, offering three sale conditions, hotel could increase profit 7.6 % compared with offering the restriction and last minute conditions, and 6.6% compared with offering the mild and last minute conditions. Three sale conditions could generate an average customer value of 40.26% compared with offering the mild and last minute conditions. In addition, customer saving when cancel the reservation of 34.49% could be reached when compared with the restriction and last minute conditions.

Session	Quality Control & Management II
Date	11/12/2014
Time	13:30 - 15:00
Room	Caymans 2
Chairs	Dinh Son Nguyen, Sofiene Dellagi

Driving 'Soft' Factors for Sustaining Quality Excellence: Perceptions from Quality Managers

Mehran Doulatabadi, Sha'ri Mohd Yusof
Universiti Teknologi Malaysia, Malaysia

Organisations which achieve high levels of performance against quality and business excellence award criteria still face challenges in sustaining their efforts. This paper has therefore set out to identify and analyze the driving 'soft' factors affecting sustaining quality excellence within the United Arab Emirates business environment. The paper uses survey data from 138 Dubai Quality Award recipient companies engaged in manufacturing and services industry and sector in the UAE. The managing directors, quality directors and managers representing at the each organization made the unit of analysis of the study. Eight 'soft' dimensions were found as critical factors for the sustainability of quality excellence. The results of this paper can be used by managers to prioritize the implementation of the 'soft' factors for long-term sustainability towards higher quality levels.

Robust On-line Monitoring for Univariate Processes Based on Two Sample Goodness-of-fit Test

Chen Zhang, Nan Chen
National University of Singapore, Singapore

On-line monitoring of quality variables and data streams raises attention in fields of quality management and statistical process control. Though much work has been dedicated on it in the literature, some challenges associated with designing distribution-free on-line control schemes are yet to be addressed well. This paper proposes a new distribution-free control chart for detecting both mean shifts and variance shifts in a univariate process based on non parametric two sample goodness-of-fit test. It also integrates the self-starting feature by using data-dependent control limits set on-line instead of predetermined limits. Simulation study shows that the chart has satisfactory in control run length performance given desired ARL and robust detection capability for general out-of-control changes, and is especially useful in short-run processes or start-up stages.

Critical Success Factors of Six Sigma: An Overview

Diego Tlapa[1], Jorge Limon[1], Yolanda Báez[1], Delia Valles-Rosales[2]
[1]*Autonomous University of Baja California, Mexico*
[2]*New Mexico State University, United States*

Main objectives of this work are to describe the current situation of factors that contribute to achieve a successful implementation of six sigma methodology and also pretends to increase their understanding. It integrates lessons learned from successful projects and considers additional progress to the approach, through an extended literature review. Two periods of time were analyzed using odds ratio, and a meta-analytic summary was conducted to study 17 factors reported in 234 studies from different countries to provide a comprehensive investigation with emphasis on establishing the evolution of six sigma. Main findings support the notion that Critical Success Factors reported in the literature are changing their frequency of use in the recent years. Top Management involvement and commitment remains as the most important CSF whereas Project selection and prioritization seems to decrease its presence nowadays.

Human Values for Implementation of Total Quality Management: Proposed Conceptual Framework of an Automated Tool

Muhammad Noman Malik, Sha'ri Mohd Yusof
Universiti Teknologi Malaysia, Malaysia

In this paper, we present the conceptual framework of human values identification and assessment for total quality management (TQM) implementation. Human values are the guiding force and critical to explore for TQM implementation and their importance have long intrigued researchers. However, literature lacks any direction for required human values identification and assessment for TQM implementation resulting in challenges for quality and HR managers to implement TQM effectively. A conceptual framework of an automated tool, its applicability and automation potential for human values identification and assessment is proposed here. Future research will utilize the outcome of this study towards development of an automated software tool.

Factors that Impact Project Quality at a Nuclear Power Plant in South Africa

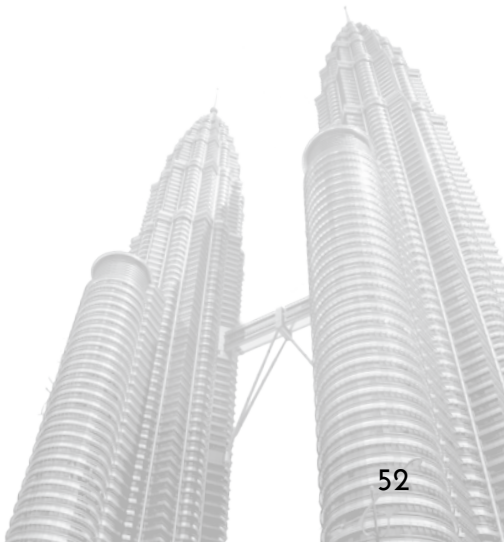
Stanley Fore, W. Galetta
Cape Peninsula University of Technology, South Africa

The nuclear industry has established stringent controls to ensure that electricity is produced in a safe and reliable manner and as such, it is expected that a nuclear power plant is operated safely, adheres to nuclear codes and standards, specifications, processes and procedures and implements projects and modifications of a high quality indicating a successfully operated plant. Project quality is one aspect for which trade-offs are constantly made making adherence a continuing concern that can have far reaching consequences. This paper addresses the factors that impact project quality at the Koeberg Nuclear Power Station in South Africa. The paper focuses on plant modifications, interactions of numerous stakeholders, processed and procedures and demonstrates how the said factors impact on project quality. Since the plant is ageing, modifications have become more complex hence all factors discussed in the paper need to be considered when implementing quality projects and modifications on the plant.

Improving Overall Equipment Effectiveness (OEE) Through the Six Sigma Methodology in a Semiconductor Firm: A Case Study

Kam-Choi Ng[1], Kuan Eng Chong[2], Gerald Guan Gan Goh[3]
[1]*Infineon Technologies, Malaysia*
[2]*Technical University Malaysia, Malaysia*
[3]*Multimedia University, Malaysia*

In today's turbulent and competitive business environment, many organizations are forced to implement various productivity improvement programs in order to continue to survive. One of the many approaches to improve production performance is to develop and implement total productive maintenance. Total productive maintenance (TPM) is a world-class manufacturing strategy which leading manufacturing near to ideal condition with zero down time, zero defect, lean production, just-in-time production (JIT) and competitive cost leader in order to gain competitive advantage. The most common metric utilized by management to gauge the effectiveness and successful implementation of TPM is Overall Equipment Effectiveness (OEE). OEE is a powerful key performance indicator focusing on equipment availability, performance efficiency and quality rate. This paper discussed on the use of the DMAIC approach to systematically Define, Measure, Analyze, Improve and Control the equipment performance. The purpose of this paper is to discuss and highlight the adoption of the six-sigma methodology to mitigate the bottleneck process which focuses mainly on the current OEE performance.



Session	Quality Control & Management III
Date	11/12/2014
Time	15:30 - 17:00
Room	Caymans 2
Chairs	Pei-Lee Teh, Kuan Eng Chong

Optimal Integrated Maintenance Policy Based on Quality Deterioration

Meriem Kouki[1], Sofiene Dellagi[1], Zied Achour[1], Walid Erray[2]
[1]*University of Lorraine, France*
[2]*ArcelorMittal Maizières Research SA, France*

It's obvious that any manufacturing system is undergoing increasing deterioration owing to usage, age and stochastic failures. Frequently, this deterioration results in the product quality degradation and hence entails a significant nonconforming cost "NCC" as well as a maintenance cost. This paper investigates the relationship between maintenance and quality by developing an economic strategy joining simultaneously maintenance and quality aspects. We consider a single machine subject to random failure and producing a progressive deteriorated product according to the failure rate evolution. A preventive maintenance strategy with minimal repair is applied in order to reduce the expected total cost per unit time including simultaneously maintenance cost and "NCC". We note that the key of our study consists of optimizing the maintenance strategy with considering the deteriorated product degree by determining the optimal number of batches produced before undertaking a preventive maintenance action.

A Study on the Optimization of Wafer Pre-treatment Conditions for Thin Film Stability Monitor

Taicheng Kevin Gong, Yanju Lisa Yu, Yan Kaily Cao, Xueliang Ruben Zhang, Kaiyuan Kevin Chang, Weiting Kary Chien
Semiconductor Manufacturing International Corporation, China

In this paper, an effective baking methodology to remove thin film stability monitor wafer surface contamination is reported. We consider baking temperature, baking time, and time interval between baking and measurement as three key factors for methodology optimization study. A long-time and durative experiment is designed for the obtaining of a suitable and feasible baking condition, in which design of experiment (DOE) is applied for the data analysis and the study of baking effect on wafer thickness change. From DOE analysis, we finally take the baking condition of 140/ 60/210 as the optimal pre-treatment condition to monitor the stability of thickness metrology tools.

Monitoring Correlation Structures Stability in Foreign Exchange Market

Siew Lee Gan[1], Maman Abdurachman Djauhari[2], Zuhaimy Ismail[1]
[1]*Universiti Teknologi Malaysia, Malaysia*
[2]*Universitas Pasundan, Indonesia*

In this paper, we analyzed the dynamics of correlation structure in foreign exchange market from year 2000 until year 2012. The time windows are yearly basic. The yearly time windows under study are non-overlapping. To monitor the correlation structures stability in foreign exchange market, the correction statistic of term on Jennrichâ€™s statistic is used. The dynamics of correlation structures is showed in the form of control chart. The graph showed that the correlation structures of particular time windows are far different from the pooled correlation structure, especially during the US sub-prime crisis 2007. The results are complied with the real situation of financial markets. To identify the root causes of certain time windows, we employed the minimal spanning tree (MST).

Control of pH Neutralization System Using Nonlinear Model Predictive Control with I-controller

Ayman Hermansson[1], S Syafiie[2]
[1]*SEGi University, Malaysia*
[2]*Universiti Putra Malaysia, Malaysia*

In the process industry controlling the pH is considered to be one of the toughest tasks among the most commonly controlled variables. This is due to the nonlinear behavior of the pH and the time dependence of the non linearity, requiring an advanced controller. In this paper a multi-model nonlinear model predictive control (MMNMPC) scheme is applied to describe and handle the non linearities, were the multi-model description gives a piece wise linear description enabling a simple and swift computation of control moves. MPC implementation requires the knowledge, through measurement or by estimation, of the states of the neutralization system, both creating various problems. Here problem is addressed by including integral action in the controller to compensate for the unmeasured states. The MMNMPC combined with integral action is tested by simulation of a pH system in Matlab and the control structures were applied in Matlab/YALMIP showing good control performance.

An Efficient Discrete Particle Swarm Optimization for Solving Multi-mode Resource-constrained Project Scheduling Problems

Jianshuang Cui, Liruoyang Yu
University of Science and Technology Beijing, China

Particle swarm optimization (PSO) algorithm was originally developed and extensively used for solving multivariable and highly nonlinear continuous problems. To apply PSO to a discrete integer-coded problem such as the multimode resource constrained project scheduling problems (MRCPSP), there should have a special mechanism that can convert the real valued solutions to the integer-coded solutions without crucial impact on the exploitative abilities of the algorithm. In this paper, we focus on this problem and develop an efficient PSO algorithm to solve the MRCPSP. Computational results by using a standard set of benchmark instances demonstrate the effectiveness and competitiveness of our algorithm.

Reliability Analysis Based on Three-dimensional Stochastic Differential Equation for Big Data on Cloud Computing

Yoshinobu Tamura[1], Kenta Miyaoka[2], Shigeru Yamada[2]
[1]*Yamaguchi University, Japan*
[2]*Tottori University, Japan*

The big data and cloud computing are attracting attention as a network service to share the computing resources such as networks, servers, storage, applications, and services. Also, many open source software are used in various software development because of the low cost, quick delivery, and standardization. In order to consider the interesting aspect of the big data and network traffic, a new approach to software reliability assessment based on three dimensional stochastic differential equation model is presented in this paper. Also, this paper analyzes actual data to show numerical examples of software reliability assessment considering such characteristics of big data on cloud computing. Moreover, performance examples of the proposed model for the big data on cloud computing are shown. Then, the performance of our model in terms of the big data, network traffic, and software fault is discussed in this paper.

Session	Supply Chain Management II
Date	11/12/2014
Time	09:00 - 10:30
Room	Caymans 3
Chairs	Nunzia Carbonara, Egon Mueller

Sourcing Decision with Correlated Supplier Disruption: An MV Framework

Pritee Ray, Mamata Jenamani
Indian Institute of Technology Kharagpur, India

This paper investigates the sourcing strategy of a buyer who faces demand uncertainty, as well as supply disruption. Under disruption, a bankruptcy at one supplier may cause collapse of other suppliers. Hence, it is important to highlight the modeling of co dependence between two or more risky suppliers. If location of the suppliers is in the same geographic proximity, then one natural disaster can affect all the suppliers in that region. Therefore, it is important to consider the impact of supplier disruption correlation for deciding the sourcing strategy. In this context, we use Markowitz's mean-variance (MV) framework to develop an MV formulation. We illustrate the case of perfectly positive and negative correlated suppliers, their order quantity and MV objective through numerical study. The result shows that the buyer should allocate the order to negatively correlated supplier to maximize the MV objective.

A Brief Review on Information Sharing within Supply Chains

Farnoush Farajpour, Mohammad Taghi Taghavifard
Allameh Tabataba'i University, Iran

Synchronizing all activities between different tiers of supply chain is an important and influencing function in supply chain management. Information sharing is a critical means in this regard. Information sharing is not just a concept but could be considered as a computable construct which helps to improve supply chain performance. This paper reviews information sharing within supply chain management literature. Based on the reviewed papers, the literature is categorized into four main classes: "information sharing and supply chain performance", "critical parameters in information sharing", "information sharing models" and "information sharing evaluation models". At the conclusion some gaps observed in the literature are discussed and suggestions for future researches are presented.

Ant Colony Optimization for One-to-Many Network Inventory Routing Problem

Lily Wong, Noor Hasnah Moin
University of Malaya, Malaysia

The integration of inventory and routing is a very important aspect of supply chain management. In this paper, we present a one-to-many inventory routing problem (IRP) network consisting of a manufacturer that produces multi products to be transported to many geographically dispersed customers. We consider a finite horizon where a fleet of capacitated homogeneous vehicles, housed at a depot/warehouse, transports products from the warehouse to meet the demand specified by the customers in each period. The demand for each product is deterministic and time varying and each customer requests a distinct product. The inventory holding cost is product specific and is incurred at the customer sites. The objective is to determine the amount on inventory and to construct a delivery schedule that minimizes both the total transportation and inventory holding cost while ensuring each customer's demand is met over the planning horizon. The problem is formulated as a mixed integer programming problem and is solved using CPLEX to get the lower bound and upper bound (the best integer solution) for each problem considered. We propose a modified ant colony optimization (ACO) by subdividing the ants into subpopulation where each subpopulation consists of different set of inventory level. The routes are improved by using local search. The algorithm performs better on large instances compared to the upper bound and performs equally well for small and medium instances.

Analysis of Quantity Discounts for Multi-period Production Planning for Single Supplier and Retailer Under Uncertain Demands

Okihiro Yoshida[1], Tatsushi Nishi[1], Guoqing Zhang[2]
[1]*Osaka University, Japan*
[2]*University of Windsor, Canada*

Global supply chain management has an important role for globalization of marketplaces and global production. The production and distribution planning for suppliers and retailers with different objectives should be coordinated to optimize the total costs. However, it is well-known that the equilibrium solution for decentralized decision making is inferior to the solution of centralized problem. This study focuses on analysis of quantity discounts for multi-period production planning for single supplier and retailer under uncertain demands. A Stackelberg equilibrium is analytically derived between single supplier and single retailer where supplier is a leader and retailer is a follower. An optimal discount contract is derived through the optimal solution of the centralized problem.

The Cluster Policies to Nation Competitiveness Based on Business Ecosystem Perspective - Case Study of Taiwanese Smart Phone Industry

Yan-Ru Li
Aletheia University, Taiwan

Clusters can be defined as regional concentrations of specialized companies and institutions connected through multiple physical and social linkages. The challenge is that there are consistently more innovations needing multiple specialized companies across national boundaries in order to continue new product development. The linkage of inter-companies has shifted by the new paradigm of ICT. At the same time, the new paradigm of business strategy changes from inside-to-outside to outside-to-inside. As such, this may influence current cluster policy. This study explores phenomena concerning the Taiwanese smart phone industry and geographical cluster issues. We find innovation makes it harder to define the industry cluster. The business ecosystem model demonstrates that different stakeholders can have a mutually beneficial basis and evolution of links. It does not focus on the geography and characteristics of industrial areas. It promotes industry policy and the rethinking of developmental strategies under the perspective of caring for local and global resource connections.

Mitigating Supply Chain Risk: A Real Options Approach

Nunzia Carbonara, N. Costantino, Roberta Pellegrino
Politecnico di Bari, Italy

The purpose of this paper is to develop a framework for the quantification of the costs and benefits associated to these supply chain risk management strategies and of their potential impact on performance as well as on the risk profile of firms. To do this, we adopt a Real Options approach, where a real option is the "right but not the obligation" to choose a course of action and obtain an associated payoff. By using this approach, in this paper we develop a real options-based framework which models some of the most common supply chain risk management strategies in terms of real options, thus posing the base for the further evaluation of the costs and benefits associated to these strategies.

Session	Supply Chain Management III
Date	11/12/2014
Time	11:00 - 12:30
Room	Caymans 3
Chairs	Yan-Ru Li, Abdul Rahman Abdul Rahim

SCM Trends and Challenges - Implications from a Cross-industry Analysis

Felix Friemann[1], Markus Gerschberger[2], Kathrin Reitner[2], Paul Schönsleben[1]
[1]*Swiss Federal Institute, Switzerland*
[2]*Upper Austria University of Applied Sciences, Austria*

The purpose of this paper is to identify new potential research areas for health care as part of the service sector. To evaluate how supply chain management (SCM) research can support this sector, supply chain principles identified by a literature review will be matched with challenges and trends identified in a cross-industry sector semi-structured interview series. Finally, a set of promising principles is identified and the potential to further analyze their application e.g. in the health care industry suggested as an area for future research.

Vehicle Routing with Time Window for Regional Network Services - Practical Modelling Approach

Iman Niroomand[1], Amir H. Khataie[1], Masoud Rahiminezhad Galankashi[2]
[1]*Canada Post, Canada*
[2]*Universiti Teknologi Malaysia, Malaysia*

Vehicle Routing Problem with Time Window (VRPTW) has demonstrated an excessive application in postal service network design. In this paper we elaborate on how VRPTW modelling approach can benefit both firm and contractors. The business objective is to facilitate the process of retendering the contracts. Accordingly, the novel modeling approach has been developed in order to improve the practicality of the results. The Ant Colony Optimization (ACO) is used for solving the VRPTW for regional post office services.

Development of a General Collaboration Model - Basis for the Establishment of a Collaboration Compass

Xiao-li Chen, Antonia Mahling, Ralph Riedel, Egon Müller
Technische Universität Chemnitz, Germany

With the speed up of globalization and its consequent increased competition, companies are suggested to collaborate in networks for their long-term success. In this work, a general collaboration model is constructed, which aims to provide a holistic insight into collaboration and shed some light on the theory of collaboration management. Different dimensions, including collaboration life-cycle, endogenous elements and exogenous elements, are listed out for the interpretation here. To go into detail, the collaboration life-cycle is further divided into six stages. Moreover, based on the social relational theory, endogenous factors are clustered into motivation, structure, components and management, while exogenous factors are represented by the perspectives of potential partners, market and society. With the proposed model, detailed information can be collected for the strategic analysis and in the end lead to a sound collaboration strategy.

Solving Inventory Routing Problem with Backordering Using Artificial Bee Colony

Huda Zuhrah Ab Halim, Noor Hasnah Moin
University of Malaya, Malaysia

We propose an Artificial Bee Colony to solve Inventory Routing Problem with Backlogging/Backordering (IRPB). The network that we consider is a one-to-many distribution network which consists of a single depot and multiple customers. A fleet of heterogeneous vehicle delivers a single product to fulfill the customers' demands over the planning horizon. Here, we assume that the depot has enough supply to cover all the demand throughout the planning horizon. Backordering is considered only when it is more economical or when there is insufficient vehicle capacity. The objective of IRPB is to find solutions such that inventory cost, backorder cost and transportation cost is optimal resulting in the minimization of the overall total cost. Artificial Bee Colony (ABC) proposed is modified from [10] where we embed inventory information and also incorporate the inventory updating mechanism to handle both inventory and backorder. We also apply 2-opt* as local search to improve the routing and the algorithm is tested on a set of benchmark problems.

Big Data Analytics for Supply Chain Management

Jens Leveling[1], Matthias Edelbrock[2], Boris Otto[1]
[1]*Fraunhofer-Institute for Material Flow and Logistics IML, Germany*
[2]*Technical University of Dortmund, Germany*

A high number of business cases are characterized by an expanded complexity. This is based on increased collaboration between companies, customers and governmental organizations on one hand and more individual products and services on the other hand. Due to that, companies are planning to address these issues with Big Data solutions. This paper deals with Big Data solutions focusing on Supply Chains, which represents a key discipline for handling the increased collaboration next to vast amounts of exchanged data. Today, the main focus lays on optimizing Supply Chain Visibility to handle complexity and to support decision making for handling risks and interruptions along supply chains. Therefore, Big Data concepts and technologies will play a key role. This paper describes the current situation, actual solutions and presents exemplary use-cases for illustration. A classification regarding the area of application and potential benefits arising from Big Data Analytics are also given. Furthermore, this paper outlines general Big Data technologies to show capabilities of Big Data analytics.

Multi Objective Supply Chain Network Design Considering Customer Satisfaction

Mahdi Bashiri[1], Hanieh Khorasani[2], Mahdyeh Shiri[1]
[1]*Shahed University, Iran*
[2]*Eyvanekey Institute of Higher Education, Iran*

In this paper a supply chain network is designed considering multiple objectives. The first objective contains total establishment and transportation costs as well as previous works while facilities depreciation costs are considered in the network. In the second objective customer satisfaction is considered which include the fill rate and the delivered products quality. Then an epsilon-constraint approach is applied to find Pareto optimal solutions comparing to the obtained non-dominated solutions by weighted sum method. Finally some sensitivity analysis is performed to check the model validity. It confirms the validity of the proposed model.

Supply Chain Risk Management: A Method and Tool Contributing to the Operational Aspects

Elena Rokou[1], Konstantinos Kirytopoulos[2]
[1]*National Technical University of Athens, Greece*
[2]*University of South Australia, Australia*

The modern supply chains are based on extended organization networks across different businesses and Industries. The uncertainty in these networks becomes a great concern for the management of the chain in a holistic approach. Several studies provide a wide list of risk management strategies and the general strategies for risk management in the supply chain. However, the way that risks should be prioritized, analyzed, treated and followed, is rarely discussed at an operational level.

In light of this gap, this paper proposes a simple method supported by a software tool, on how to manage the risks that can lead to the supply chain's disruption at an operational level. The method is "borrowed" by the project management discipline and the way that they manage risks. The main steps of the method cover: a) the identification of the risks related to each echelon of the supply chain, b) the classification of risks c) the analysis and ranking of risks d) the treatment strategies, and e) the follow up of risks. The steps of the method are supported by the proposed software tool.

Session	Manufacturing Systems II
Date	11/12/2014
Time	13:30 - 15:00
Room	Caymans 3
Chairs	Urs Buehlmann, Bimal Nepal

Joint Optimization of Production-maintenance Plans Based on Optimal Production Rates

Jeremie Schutz
Université de Lorraine, France

This paper deals with production and maintenance plans. Among a set of proposed requests, the production system must satisfy several of them. Each request is characterized by a profit, products quantity and delivery date. The choice of the requests to perform must allow to maximize net profit. To achieve this objective, preventive maintenance plans and optimal production rates associated with each request must be computed jointly. To solve this problem, a great deluge algorithm is used. A numerical example is also given to illustrate the proposed model.

A New Bi-objective Mathematical Model for Sustainable Dynamic Cellular Manufacturing Systems

Farzad Niakan, Armand Baboli , Thierry Moyaux, Valerie Botta-Genoulaz
Université de Lyon, France

This study addresses dynamic cell configuration and labor assignment by making a trade- off between economic, social and environmental criteria which is called as sustainability configuration. In order to improve the study about energy loss, a new bi-objective mathematical model is presented. The first objective of model minimizes cost criteria and the second one energy loss which is represented by the efficiency of each machine. We develop a Non-dominated Sorting Genetic Algorithm (NSGA-II) in order to solve our model. The applicability of our approach is illustrated by two test problems.

Optimization of Green Electrical Discharge Machining Using an Integrated Approach

Jagadish[1], Amitava Ray[2]
[1]*National Institute of Technology Silchar, India*
[2]*Jalpaiguri Government Engineering College, India*

This paper presents an integrated approach of Entropy–Technique for Order Preference by Simulation of Ideal Solution (TOPSIS) method for the determination of the optimal process parameters in green electrical discharge machining. In this work, initially, an experiment is performed using Taguchi experimental technique. Thereafter, Entropy-TOPSIS is used to convert multi response parameters into single response parameter. Finally, the ranking of the parameter decides the best experimental set up and optimized the input process parameters. In this research, the weight of the quality characteristics of each of the output parameters are determined by the entropy method which influences the closeness coefficient values for finding the optimal experimental set up using TOPSIS method.On the basis of optimization results it has been found that peak current (4.5 A), pulse duration (261 μs), dielectric level (80 mm) and flushing pressure (0.3 kg/cm^2), which are the best combinations of this analysis.

A Conceptual Framework for the Performance Assessment of Lot Release Policies

Rashmi Singh, Muthu Mathirajan
Indian Institute of Science, India

This paper presents a conceptual simulation framework (CSF) for the assessment of lot release policies on selected performance metrics, such as cycle time, WIP level and throughput rate. The development of a CSF is derived from the analysis of the semiconductor wafer fabrication, which is perhaps one of the most complex manufacturing processes found today. Due to economic efficiency and increased complexity, simulation emerges as a powerful technique that can capture and analyse such complex systems. The CSF which is developed here is expected to improve the productivity of simulation analyses and furthermore, it reduces the preparing time for input data and errors.

Applying Lean and TOC to Improvement Delivery Performance for Machine Tool Manufacturers

Chuang-Chun Chiou[1], T.W. Jhang[2], Y. X. Deng[2], J.T. Tsai[2], C. Perng[2]
[1]*Dayeh University, Taiwan*
[2]*Tunghai University, Taiwan*

In this study, we apply the concept of lean system and the logic of Theory of Constraint to Machine tool industry which is one of the most competitive industries in Taiwan. The main objective of this study is to improve the due-date performance by using process of lean thinking and Strategy & Tactic Tree of TOC. After the lean thinking and TOC had been implemented, the efficiencies are improved in many areas, such as decreasing manpower, shortening the transportation distance, production leveling, decreasing the lead time and increasing the fill rate. The holistic effect of lean system is prevailing in every operation not only in manufacturing department; it is also drawing attention from sale, procurement, and engineering design departments. We found one important factor that without the support and the determination of the top level managers the effectiveness will be limited.

Interactive Virtual Machining System Using Informative Data Structure and On-site Machine Tool Status

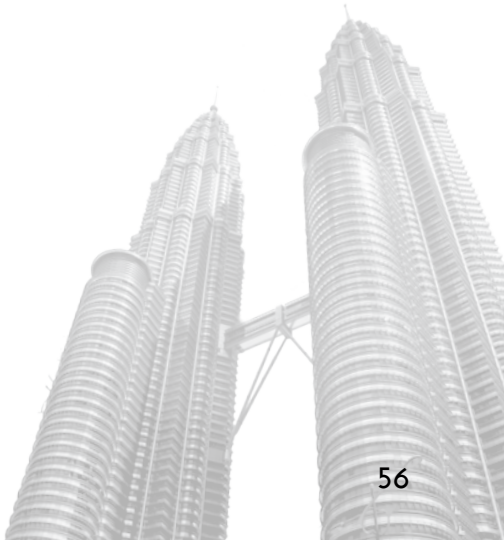
Aini Zuhra Abdul Kadir[1], Xun Xu[2]
[1]*Universiti Teknologi Malaysia, Malaysia*
[2]*University of Auckland, New Zealand*

Virtual machining systems that are adaptive and responsive towards real machining environment are crucial to leverage a deep understanding of the underlying machining operations. It must retain radical behavior in order to enhance process planning and machining performance, in response to ever-changing manufacturing activities. Therefore, the study aims to develop an interactive virtual machining system that is responsive to on-site machine tool condition utilizing STEP-NC as the data structure. Signals from sensors are acquired, processed and converted into meaningful values where they were then incorporated in the system enabling tool-path simulation in a realistic environment. The system platform was constructed using C# programming software, EXPRESS for constructing the data structure, and LABWindows for signal processing. The tested capabilities of the system functions showed that the up-to-date information obtained, truly supports the inter-working concept in a virtual-real systems interaction which leads to reduction of the total production time.

A Simulation Based System for Manufacturing Process Optimisation

Hossam Ismail[1], Lina Wang[2], Jenny Poolton[2]
[1]*Xian Jiaotong-Liverpool University, China*
[2]*University of Liverpool, United Kingdom*

Simulation models have been extensively used in manufacturing to enhance the design, planning and decision making processes. However, the tendency has been to use simulation in one-off applications, often at the start of a project and not take account of inherent process changes over time. This has inhibited their contribution as a real-time decision make tool. This paper describes how simulation is used as a component of an integrated optimisation platform to support real-time decision making in a highly variable manufacturing process environment where outputs are stochastic. The paper follows by proposing an integrated framework for addressing issues of process variability in simulation based systems.



Session	Manufacturing Systems III
Date	11/12/2014
Time	15:30 - 17:00
Room	Caymans 3
Chairs	Nihal Jayamaha, Chuang-Chun Chiou

Multi-skeleton Model for Top-down Design of Complex Modular Products

Dexin Chu, Xuening Chu, guolin Lv, Yuliang Su, Dongping Chen
Shanghai Jiao Tong University, China

To fulfill TDD(top-down design) strategy for efficient design of complex modular products supported by current CAD tools, building the unified information transmission mode is critical to solve the inconsistency of longitudinal strong constraints of TDD and horizontal flexibility of configuration modular products. Based on the recursive-execution and structure-evolvement of TDD and modular configuration design process, we put forward to replace constraints by published skeleton through inheritance information refinement and classification. Meanwhile, multi-skeleton model for one assembly is proposed to substitute one skeleton of traditional TDD. These skeletons are centralized by position skeleton in modular combination manner, which not only facilitate product cascading change automatically, also ease to reuse and modify module, and validate product and system. Crawler crane sample is elaborated to illustrate the multi-skeleton model application effects of entire products design process, design change and modular reuse. Finally, the conclusion of the work and future directions are given

Optimized Tool Path Planning in 5-Axis Flank Machining using Electromagnetism-like Algorithms

Chi Lung Kuo[1], Chih-Hsing Chu[1], Ying Li[2], Xinyu Li[2], Liang Gao[2]
[1]*National Tsing Hua University, Taiwan*
[2]*Huazhong University of Science & Technology, China*

Optimization of tool path planning using metaheuristic algorithms provides a feasible approach to reduce geometrical machining errors in 5-axis flank machining of ruled surfaces. The solution quality of these algorithms is unsatisfactory in a high-dimensional search space. In this study, various algorithms derived from the electromagnetism-like mechanism (EM) were applied. The test results of representative surfaces showed that all EMbased methods yield more effective optimal solutions than does PSO, despite a longer search time. A new EM-MSS (electromagnetism-like mechanism with move solution screening) algorithm produces the most favourable results by ensuring the continuous improvement of new searches. This work improves the practical values of tool path planning by offering a satisfactory machining quality.

Signal Propagation Model Calibration Under Metal Noise Factor for Indoor Localization by Using RFID

Seng Fat Wong, Xue Ni
University of Macau, Macau

Radio frequency identification (RFID) technologies as an effective indoor localization solution are acquiring increasing attention for its low cost and compactness and it plays a significant role in industrial engineering. However, the location accuracy strongly relies on environment factor that will affect the signal propagation property (using by position system). To alleviate limitation imposed by this reason unlike others, this paper proposes a new calibrated Received Signal Strength Indication (RSSI) propagation curve for high accuracy under metal noise factor. Therefore this curve is obtained by taking the metallic effect characteristic into consideration. The proposed results are obtained from practical experiments by RF Code M250 and R150 tags. Aimed at incorporating these features into localization algorithm appropriately and then the accuracy of RFID-based positioning system under metal noise factor can be improved substantially.

Experiential Learning: Lean Team at Virginia Tech

Urs Buehlmann[1], Omar Espinoza[2]
[1]*Virginia Tech, United States*
[2]*University of Minnesota, United States*

Experiential learning has not yet found the attention it deserves in academic teaching. This paper describes a successful way to teach students highly complex subjects using experiential learning methods. To teach Lean, Virginia Tech students have created a student-driven, faculty supported team who conducts lean transformation events at cooperating companies, conducts industry workshop to teach Lean, and uses self-guided learning to improve team member performance and knowledge.

Results show that students are highly motivated and become self-driven agents through the opportunity to be a member of a high performing team and to contribute to the team's success. When graduating, students remain connected to the team and continue to contribute and participate in the team's activities.

The Backward Growing Method for Constructing 3D Process Models in the Machining Process Planning

Jinfeng Liu, Xiaojun Liu, Yalong Cheng, Zhonghua Ni
Southeast University, China

A 3D process model shows the manufacturing information intuitively in different machining stages. Efficiently and easily constructing 3D process model is one of the most important key technologies in 3D computer aided process planning system and it meets the requirements of the current 3D manufacturing environment. Thus, this paper focuses on creating the 3D process models (3D-PMs) based on the backward growing methodology. Firstly, the 3D-PM is analyzed and decomposed into two parts: the working procedure model and the process attribute information. Then, the WPM construction method is proposed by using the geometrical reasoning knowledge and it is composed by the removal material volume and the after processing model. Then the process attribute information is appended on the working procedure models based on the proposed rules. Finally, the results of taking a machined part as the study case verify the validity of the developed method.

Proposal of a Decision Making Model to Select the Best Fitting Cost Estimation Technique in an ETO-MC Environment

Aldo Duchi[1], Golboo Pourabdollahian[2], Davide Sili[2], Matteo Cioffi[2], Marco Taisch[2]
[1]*ETH Zurich, Switzerland*
[2]*Politecnico di Milano, Italy*

ETO companies are characterized by their ability to produce purely customized goods through individualized engineering process. However, recently many of ETOs have considered a shift toward MC to operate with more stable processes to increase efficiency and decrease lead time. This paper aims at analyzing this shift from an operational point of view by developing a decision making model to support these companies in selecting the best estimation technique in terms of engineering cost.

Session	Information Processing & Engineering II
Date	11/12/2014
Time	09:00 - 10:30
Room	Caymans 4
Chairs	SC Johnson Lim, Abdul-Wahid Saif

Development of a Methodology for Cost-oriented Ramp-up Design

Achim Kampker, Christoph Deutskens, Andreas Maue
RWTH Aachen University, Germany

Rapid product lifecycles and a growing product range lead to an increasing number of production ramp-ups. In addition customers demand for more individual products, so that the number of units for products decreases. These factors lead to a growing importance of ramp-up costs. A new five partial model-based methodology is developed, that allows influencing the product and production system before and during the ramp-up phase. The methodology enables to analyze specific ramp-up costs, identify the impact factors and deduce measures in order to improve the cost situation while considering the whole ramp-up target system regarding quality, time and lifecycle costs.

Discovering Product Feature and Affective Associations Through Collaborative Tagging

S. C. Johnson Lim[1], Suhaili Jawaris[2]
[1]*University Tun Hussein Onn Malaysia, Malaysia*
[2]*Universiti Tun Hussein Onn Malaysia, Malaysia*

Affective or kansei design is a field of design engineering that concerns with designing emotionally pleasing products. One of the challenging issues in this area is to successfully understand customer's affective needs and to interpret it in terms of product design elements. Previous studies have attempted to obtain customer's affective needs using manual approaches, e.g. survey, which is a time-consuming and costly process. In relation, the study of such a need is usually limited to a number of product features only. In this study, we have proposed a collaborative tagging approach for discovering product features, affective description and their associations through product review analysis. Specifically, we have discussed on the task assignment, tags aggregation and performance analysis of our proposal. A case study on discovering feature-affective associations from car reviews is reported to showcase the feasibility of our approach.

Construction of an Interactive Behavioral and Feature Structure Model for Facebook

Tsung-Yi Chen[1], Meng-Che Tsai[2], Yuh-Min Chen[2]
[1]*Nanhua University, Taiwan*
[2]*National Cheng Kung University, Taiwan*

All businesses need to attract customers, and promoting a firm's goods and services is the most direct way to achieve this. The use of effective communication strategies can help in this regard, and such efforts can be enhanced if more information can be obtained about the personality traits of the target audience. This study proposes a mechanism for automatically inferring users' personality traits from their social media records, instead of more traditional ways such as face-to-face interviews and observations or questionnaires. This study presents an "interactive behavioral model" and a large number of "interactive behavioral features" for use with Facebook. With regard to practical applications, the proposed mechanism could be used as a cloud-computing service, and the system architecture to support this is presented. In the future, the system could serve businesses as a decision support tool for developing better marketing plans and customized sales.

SWOT Analysis of NPTEL Knowledge Portal

Kalyan Kumar Bhattacharjee
Indian Institute of Technology Delhi, India

Indian higher education has grown in an unplanned manner in terms of access and quality. There exists a large gap in demand and supply of Indian education. There is an acute shortage of quality institute and competent academic staff members in Institute of Higher Learning in Technologies (IHLTs) in India. Such a huge shortage of faculty and infrastructure is difficult to remove. A credible alternative may be e-learning through which the reach of quality teachers can be extended and make them available to the outside world using the potentials of Information and Communication Technology (ICT). National Program of Technology Enabled Learning (NPTEL) is a platform which has been setup by Govt. of India for this purpose. In this paper the usefulness of NPTEL portal have been evaluated using SWOT model, based on the survey conducted among the users of the portal where 2323 responses have been obtained. The result reveals that the portal is successful in smooth knowledge transfer.

Life Cycle Inventory Analysis and Equivalent Carbon Dioxide Emissions Calculation of the Mining and Ore Concentration Processes of PGM at The Anglo American Platinum Ltd, South Africa

Junior Mabiza[1], Charles Mbohwa[1], Michael Mutingi[2]
[1]*University of Johannesburg, South Africa*
[2]*Namibia University of Science & Technology, Namibia*

Platinum group metals (PGM) are suitable for variety of specialty uses. A growing demand of PGM is expected to address environmental challenges; meanwhile, the extraction and recovery of PGM are among the most polluting activities to the environment. Sustainability reporting issued by mining companies annually provides figures covering economic, social as well as environmental performances; all together reflect on sustainability performance. In most reports, environmental aspect focuses on the progress made in improving the system performance in terms of satisfying compliance of emission reductions required by the regulations, and are not looked at stream value assigned to PGM currently. This study examines the growing concern of environmental emissions of PGM mining and ore concentration activities in South Africa; a case study of Anglo American Platinum.

Session	Technology & Knowledge Management II
Date	11/12/2014
Time	11:00 - 12:30
Room	Caymans 4
Chairs	Michael Gepp, Seung Ki Moon

Methodology for Resource Allocation in the Tool and Die Industry

Guenther Schuh, Martin Pitsch, Thomas Kühn, Advan Begovic
RWTH Aachen University, Germany

The effects of globalization have caused a continuous increase of competition intensity within the tool and die industry. Thus European tool shops have access to emerging markets but in the same time they have to face new competitors with lower factor costs. Furthermore customer requirements have changed. New customer requirements lead to derivatization and decreasing product lifecycles. The demographic change results in limited availability of skilled and experienced employees which especially affects know-how intensive industries as the tool and die industry. In sum all factors force European tool shops to aim for a fast, efficient and cost minimal manufacturing process. This aim is only achievable by a capable employee and technology allocation. This paper presents a methodology developed by the Laboratory for Machine Tools and Production Engineering (WZL) of RWTH Aachen University, which shows an appropriate resource allocation regarding employees and technologies to enable an optimal value creation process.

Measuring the Quality of Cooperation in Interdisciplinary Research Clusters

Stefan Schröder, Markus Kowalski, Claudia Jooss, R. Vossen, Anja Richert, 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. Therefore interdisciplinary research has taken on continuously greater significance. Over the last years various research clusters - such as cluster of excellence - were initiated in the course of the German excellence initiative. Thereby researchers with different disciplinary backgrounds are brought together, to investigate research questions with societal and economical relevance. These new research clusters cause various challenges, especially on communication, because communicaÂ¬tion is one decisive factor of success in interdisciplinary cooperation. Approaches to investigate communication, performance and interdisciplinarity within these clusters are compared and a communication oriented measurement approach is explained. Especially the operationalization and validation of the indicator communication, giving conclusions onto the quality of cooperation, is depicted as well as measures to react on.

Do We Miscount Patent Citations? An Empirical Study on the Impact of Overlooking the Citations to a Patent's Pre-grant Publication

Chung-Huei Kuan, Hsiang-Jui Cheng
National Taiwan University of Science and Technology, Taiwan

Utility patent applications are usually published 18 months after they are filed and before patents are actually issued. These so-called pre-grant publications and their corresponding issued patents are both cited individually and concurrently by the applicants or examiners of subsequent patent applications as relevant prior art. Most patent analysts however overlook the citations to the pre-grant publications and consider only those to the issued patents. This study assesses the impact of such omission by comparing the citations to about 140,000 US utility patents and their pre-grant publications. The statistics shows that 70% of the patents are underestimated by various degrees if the citations to their pre-grant publications are ignored, suggesting that analyst should combine the citations to the pre-grant publications and to the patents together when evaluating patents or conducting patent citation analysis.

The Contribution of Technology to Improving Meanings: The Quantitative Analysis of Meanings

Satoru Goto, Shuichi Ishida
Ritsumeikan University, Japan

This paper focuses on an innovation of product meanings. Although the literatures on the product meanings are rich, they didn't mention how a company makes new meanings because they focus on examination of the process. Therefore, this paper suggests the comprehensive framework between technologies and product meanings and quantitatively examines the response of consumer in kakaku.com, which is the Website for price comparing in Japan. We defined that meanings consist of aesthetic impression, semantic interpretation and symbolic association. The results of linear regressions show that consumer emphasis on semantic interpretation. Therefore,technologies on semantic interpretation should be developed in NPD. Our framework and results can stimulate further investigation on the innovation of meanings in the discipline of technology management.

Advance of Research on Technology Acceptance

Ruiping Yang, Liyan Zhou, Xinxin Hou, Yiming Xiang
Zhejiang Gongshang University, China

It gets extensive attention by scholars since the TAM is put forward. From the most primitive TAM to recently UTAUT2 proposed by Venkatesh, different scholars in different fields study on various TAM from different angles, and the technology acceptance related models experiences a series of development course. This study systematically arranges the papers in leading journals of technology acceptance study, takes the evolution process of each model as a logical clue, analyzes the technology acceptance research context systematically, and also points out the deficiencies in the technology acceptance research with the hope of providing some reference for the follow-up study.

Readiness of Malaysian E-Commerce Companies to Harness Web2.0's Competitive Advantage: An Engineering Management Approach

Ching Chieh Kiu[1], Chien-Sing Lee[2]
[1]*UCSI Universitty, Malaysia*
[2]*Universiti Tunku Abdul Rahman, Malaysia*

The emergence of Web 2.0 technologies have changed the way how e-commerce can be sustained and improved, i.e., by enhancing competitive advantage. Integrating Web 2.0 technologies into e-commerce Websites not only helps to improve customer shopping experience but also helps to enhance customer engagement. This paper will discuss the role and impact of Web 2.0 technologies in terms of how they can be used to improve and enhance ecommerce's competitive advantage. A case study on Web 2.0 technologies' usage on top 10 e-commerce websites in Malaysia has proven that social media such as Facebook plays a significant role in improving competitive advantage. Findings indicate that most of the e-commerce websites have substantially integrated Web 2.0 technologies in order to gain and improve their competitive advantage and that social media improves customer shopping experience and customer engagement at online retail stores.

Educational Leadership: The Effects of Leadership in Students Educational Performance in Engineering Institutes

Subhashini Gopal Krishnan, Vinesh Thiruchelvam
Asia Pacific University of Technology and Innovation, Malaysia

Since the early 21^st century, there is a enormous significance on educational leadership. This is because of the widespread idea that the excellence of leadership can make major differences to an institute and its students outcomes. In various parts of the world, there is acknowledgment that institutes require well-organized principals if they are to provide the best education for their students. As the worldwide economy changes rapidly, more organization are realizing that their main resources are their citizen and that remaining, or becoming competitive depends gradually more on the growth of highly skilled personnel. This eventually requires qualified and loyal educators and this means they need the leadership of greatly efficient principals and the support of other senior managements

Session	Information Processing & Engineering III
Date	11/12/2014
Time	13:30 - 15:00
Room	Caymans 4
Chairs	Seng Fat Wong, Chih-Hsing Chu

An Efficient Method for Checking Overlaps and Construction Algorithms for the Bitmap Shape Packing Problem

Sho Fukatsu, Yannan Hu, Hideki Hashimoto, Shinji Imahori, Mutsunori Yagiura
Nagoya University, Japan

The two-dimensional strip packing problem arises in wide variety of industrial applications. In this paper, we focus on the bitmap shape packing problem where a set of arbitrary shaped objects represented in bitmap format should be packed into a larger rectangular container without overlap. The complex geometry of bitmap shape and large amount of data to be processed make it difficult to check overlaps. For this reason, most of the algorithms in the literature only deal with small-scale instances. We propose an efficient method for checking overlaps and design efficient implementations of two construction algorithms, which are based on bottom-left strategy. The computational results for a series of well-known benchmark instances show that the proposed algorithms obtain good solutions in remarkably short time and are effective for large-scale instances.

Managing Conflict in Distributed Projects

Ramin Shahzadi, Mohsen Sadeghi, Asal Aghaz
Amirkabir University of Technology, Iran

Since late 1990s, the increasing number of complex and knowledge based industries in one hand, and formation of IT-based communications on the other hand, have raised the possibility of communication in international projects between different groups from several countries around the world. Nowadays, the emergence of multinational and massive scale projects is increasing. For such projects, traditional and routine frameworks should be replaced by some new concepts such as mega projects, distributed projects and GVT (Global Virtual Teams). Although conflicts are natural and inevitable in the distributed projects, inadequate attention to proper management of conflict, specifically in distributed projects facing with several sources of conflicts, can lead to ineffectiveness of such projects. So, the purpose of our research is to investigate and classify the sources of conflicts in distributed projects and to develop the methods to manage the identified conflicts. Data was gathered using questionnaires and interviews. Results indicated three elements including team members, process and technology as the main factors causing conflict in distributed projects. At the end, some future orientations have been suggested for future research.

Analysis of Scientific Research Structure in Singapore Using Bibliometrics and Network Analysis for Understanding Their Characteristics of R&D: A Case Study of Biomedical Field

Ken Hayashima, Haruki Sawamura, Ichiro Sakata, Yoichiro Matsumoto, Hajime Sasaki
The University of Tokyo, Japan

These days, we are seeing increasing demand for accurate measurement of the effectiveness of policies. However, it has been difficult to measure the effectiveness of policies accurately, because of the limited number of methods, which include interviews, analysis based on the number of patents, and analysis of theses. Therefore, there is increasing demand fora methodology for precise measurement. Through this research, we would like to be part of those researches trying to satisfy this demand by adopting bibliometric analysis.

In this paper, we introduced network analysis in order to evaluate a country's presence in the academic field.In particular, we focused on three centralities, betweenness centrality, eigenvector centrality, and closeness centrality, in the measurement. As a result, it is shown that Singaporean institutes have higher centrality, especially betweenness centrality, as well as a high ratio of international researchers

Modelling Financial Flow of the Supply Chain

Mohammad Hossein Jahangiri, Franjo Cecelja
University of Surrey, United Kingdom

Many works have been done on the product flow of the supply chain whereas there is a little research works on the financial aspect of the supply chain. Moreover, bullwhip effect like lead time is usually considered on the product flow of the supply chain and no literatures review this effect on the cash flows. In this paper, the flow of cash in a supply chain is considered from the manufacturer point of view who receives money from its customers and makes payment to the suppliers. Astochastic model to maximise firm's profit and to find the best strategy of paying payment is developed.Furthermore,we investigate the effect of late payment on the firm's profit within the supply chain.Finally, the effect of logistic bullwhip on the cash flow and firm's profit is investigated.

Role of Walsh Codes and Pseudorandom Noise Sequences in CDMA

Puneet Chawla, Balwinder Singh
PEC University of Technology, India

Walsh Codes are a set of orthonormal codes while PN Sequences are statistically random but deterministically formed binary sequences. This paper discusses the basic concepts underlying both sets of codes and some of their practical and interesting properties. Both are extensively used for multiple access channeling methods and data signal modulation particularly in international CDMA standards. Their implementation in CDMA and the factors influencing their relative performance are also explained.

Learning from Past Changes - Towards a Learning-oriented Engineering Change Management

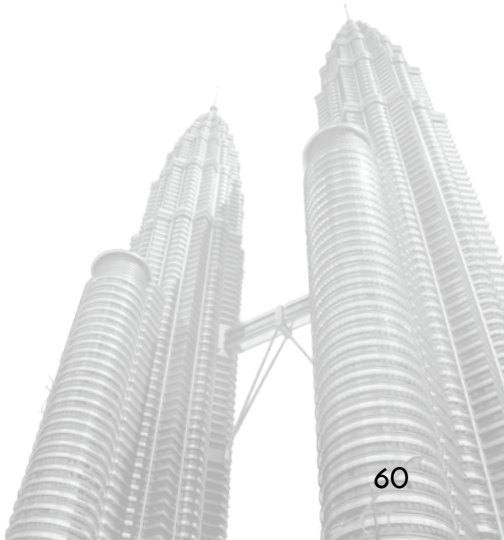
Christoph Hollauer, Martina Wickel, Udo Lindemann
Technische Universität München, Germany

Due to the complex nature of Engineering Change Management (ECM), managing knowledge and supporting an organizational as well as personal learning process is a difficult but important task to support the realization of changes. This paper presents an approach to improve ECM by applying and adapting existing knowledge management methods with the aim of supporting companies in generation, transfer and application of knowledge. The approach is based on a literature review in different research fields like organizational learning and knowledge management. Based on the findings, a framework for managing and cultivating knowledge specifically in the domain of ECM has been developed. The concept incorporates different aspects like knowledge transfer and knowledge generation from available information on an interpersonal and technical level. The developed approach aims at a continuous and eventually self-sustaining process of knowledge generation, sharing and application.

A Study of Applying Severity-weighted Greedy Algorithm to Software Test Case Prioritization During Testing

Yen-Ching Hsu, Kuan-Li Peng, Chin-Yu Huang
National Tsing Hua University, Taiwan

Regression testing is a very useful technique for software testing. Traditionally, there are several techniques for test case prioritization; two of the most used techniques are Greedy and Additional Greedy Algorithm (GA and AGA). However, it can be found that they may not consider the severity while prioritizing test cases. In this paper, an Enhanced Additional Greedy Algorithm (EAGA) is proposed for test case prioritization. Experiments with eight subject programs are performed to investigate the effects of different techniques under different criteria and fault severity. Experimental results show that proposed EAGA perform well than other techniques.



Session	Technology & Knowledge Management III
Date	11/12/2014
Time	15:30 - 17:00
Room	Caymans 4
Chairs	Chung-Huei Kuan, Ralph Riedel

Fasten Your Seatbelts, Turbulence Ahead: Environmental Turbulence as a Determinant of Absorptive Capacity

Valeria Stulova, Mait Rungi
Tallinn University of Technology, Estonia

Absorptive capacity of an organization, or its ability to use externally generated knowledge for own benefit, is an important determinant of organizational success. At the same time, environmental turbulence is constantly re-shaping business terrain, affecting organizations, resources at their possession and their capabilities. This paper investigates the impact of the subsets of environmental turbulence on absorptive capacity, aiming to understand how much does the environment define the ability of organizations to learn from information generated externally. The results demonstrate that technological turbulence exercises the most influence on all facets of absorptive capacity of organizations, followed by the evolvement of new opportunities to apply their know-how. Dynamism enhances continuing development and bottom-up innovation subsets of absorptive capacity the most; exercising mostly negative influence on deferred knowledge use and trust-based internal cooperation.

A Preliminary Survey on Modeling Customer Requirements from Product Reviews Under Preference Uncertainty

Anies Zakaria, S. C. Johnson Lim
University Tun Hussein Onn Malaysia, Malaysia

Nowadays, design and manufacturing companies are constantly investigating ways to offer products that are able to meet with the ever changing customer taste. Therefore, identifying customer requirements is important towards designing successful products. Recently, acquiring customer requirements from product reviews is a preferable approach that offers certain advantages over common methods such as interviews and questionnaire studies. However, uncertainty is usually a less emphasized factor in requirements modeling. This paper presents a survey on the recent achievements in identifying customer requirements from product review, with the preference uncertainty factors considered. Three main topics on identifying voice of customers (VoCs), VoCs from product reviews and uncertainty in customer requirement are explicitly discussed. Based on our extensive survey, a number of research challenges concerning the aforementioned topics have been identified and suggested. We have also briefly discussed on a few promising further research directions based on our findings.

Hybrid Intelligent Patent Mapping for Offshore Wind Industry Analysis

Chin Yuan Fan[1], Shou Hao Chang[1], P. S. Fan[2], L. F. Kao[3]
[1]*National Applied Research Laboratories, Taiwan*
[2]*China University of Science and Technology, Taiwan*
[3]*National Taipei University of Technology, Taiwan*

Offshore wind technology is the most popular in recent years, the field of energy technology issues, was becoming increasingly relevant research. However, the research is still lack in the patent portfolio. This study examines numerous patent and use Intelligent clustering method try to identify appropriate patents by examining all-world patent pool cases of offshore wind power development, a form of alternative energy, and analyzing technology and patent maps. Thus, we identified a promising research direction, thereby enabling industry personnel to make technological breakthroughs in this field.

Users' Acceptance of IT and Its Impact on Knowledge Sharing: A Case in the South African Banking Industry

Abdulkadir Kolawole Bello, Kai-Ying Chan
University of Pretoria, South Africa

Past research have pointed out that one of the major challenges facing knowledge management processes is to help employees share what they know within an organisation. The challenge here lies on people who use IT tools for knowledge sharing, therefore knowing users' attitude and behaviour when using IT for knowledge sharing is important. The model that will be used for this research is based on the Technology Acceptance Model, with an extension derived from Kelman's process of shared influence known as subjective norms. The results show that the perceived usefulness of IT for knowledge sharing has more influence on users' intention to use IT as compare to the impact of subjective norms. It is recommended that training programs, seminars, and workshops should be organised to escalate awareness and enhance employees' perceived usefulness of these IT tools for knowledge sharing.

Interpretive Structural Model of Key Performance Indicators for Sustainable Manufacturing Evaluation in Cement Industry

Elita Amrina, Annike Lutfia Vilsi
Andalas University, Indonesia

This paper aims to analyze the relationships among the Key Performance Indicators (KPIs) for sustainable manufacturing evaluation in the cement industry. The initial KPIs have been identified and derived from literature, and then validated by industry survey. As a result, three factors dividing into a total of thirteen indicators have been proposed as the KPIs for sustainable manufacturing evaluation in cement industry. Interpretive structural modeling (ISM) methodology is applied to develop a network structure model of the KPIs. The results show the indicators of economic factor are regarded as the basic indicator, while the indicators of environmental factor are indicated to be the leading indicator. Of those indicators, raw material substitution is regarded as the most influencing indicator. The ISM model can aid the cement companies by providing a better insight in evaluating sustainable manufacturing performance.

What Innovation Managers Really Do - An Empirical Study About Tasks, Skills and Traits of Innovation Managers in Germany

Maximilian A. Maier
Friedrich-Alexander-Universitaet Erlangen-Nürnberg, Germany

Managing innovation leads to a kind of contradiction. On the one hand, innovation needs informal structures and communication, free flow of information and room for creativity. On the other hand, companies strive for efficiency and lean processes. Therefore, companies structure and formalize the innovation management process. As part of this process the profession of an innovation manager emerged. Like in many other roles in management, the innovation manager has designated tasks, as well as certain skills to perform these tasks. Additionally, an innovation manager may have a typical personality. This study answers the questions about the typical tasks, skills and personality traits of innovation managers especially in Germany. I found that the picture of a multi-talented generalist, managing the whole innovation process is only partly right. Finally, more findings and ideas for further research are discussed.

Session	E-Business & E-Commerce
Date	11/12/2014
Time	09:00 - 10:30
Room	Kaywest
Chairs	Jindong Li, Hing Kai Chan

Adoption of Near Field Communication for Mobile Payment: Evidence from Macau

Kin Meng Sam[1], Chris Chatwin[2], Jing Xin Zhang[1]
[1]*University of Macau, China*
[2]*University of Sussex, United Kingdom*

The proliferation of mobile banking is creating increased opportunities for seamless businesses processes. The advent of Near Field Communication (NFC) could facilitate the future of mobile payment. Even though NFC has been adopted in several countries, this new technology has not been adopted by individuals in Macau, where the tremendous economic growth is greatly dependent on the gaming industry. This paper presents a study on consumers' attitudes towards adoption of NFC enabled mobile payment technology in Macau. By using Technology Acceptance Model (TAM) and related literature, an evaluation model is designed to analyze users' adoption of NFC in Macau. The results reveal academic and practical implications for future development and implementation of NFC in Macau.

The Implementation Strategy of Key Task for ERP Activities

Te- King Chien, Ming-Sian Cheng
National Formosa University, Taiwan

Enterprise resource planning (ERP) system can help business executives effectively integrate and apply resources, and thus becomes an essential factor for business operation. But, its implementation process must continue to integrate, build and reconfigure internal and external resources, procedures and capabilities. So many scholars have proposed a variety of solutions attempting to improve the effectiveness of implementation activities, but the results are too conceptual and segmentary, and the process and practice of implementation activities are not clear.

For this reason, this study combines qualitative interview method with multiple criteria decision-making method (MCDM) to establish the "tasks execution order decision table" and "implementation strategy diagram" of ERP implementation activities. Also through a case study, this study confirms that reasonableness and correlation of the results can help enterprise grasp the task and decision making direction, enhance success rate, and reduce redundant resources waste in ERP implementation activities.

Consumer Attitudes Toward Online Video Advertising: An Empirical Study on YouTube as Platform

Keng-Chieh Yang[1], Conna Yang[2], Chia-Hui Huang[3], Po-Hong Shih[2], Su Yu Yang Yang[2]
[1]*Hwa Hsia Technology of Univeristy, Taiwan*
[2]*National Chiao Tung University, Taiwan*
[3]*National Taipei College of Business, Taiwan*

The usage of Internet is getting widespread, and the service of online video is getting more and more popular. The revenue of the web service providers comes mostly from the advertisements. This study investigates the attitudes toward the advertisements while watching online videos in YouTube. We followed the research of users' attitudes toward advertisements (Brackett & Carr, 2001) and combined it with the theory of reasoned action and the flow theory in the psychology. This study investigates the factor affecting attitudes toward advertisements and the influence to behaviors. Our findings show that the model explained most of the variance of attitudes toward advertisements in sites providing services of online videos indicating that the model is confirmed in the situation of online video advertising. The conclusion and managerial implications have further discussions.

The Role of Perceived Value on Customer E-shopping Intention Using Technology Acceptance Model, (TAM)

Ali Hajiha[1], Mohammad Reza Shahriari[1], Nayereh Vakilian[2]
[1]*Islamic Azad University, United Arab Emirates*
[2]*Islamic Azad University, Iran*

Lack of trust in e-commerce is a major reason that prevents customers to shop via internet. Since customers assess the cost and benefits and then decide to purchase, this study aims to investigate the role of perceived value and online trust on customer intention towards e-shopping through the Technology Acceptance Model, (TAM). Testing the relationships between the variables of the model, 160 questionnaires were accomplished by the graduated students of Information Technology (IT) management who are studying virtually in the Islamic Azad University and at least have had an e-shopping experience once before. The results showed that the perceived ease of use, usefulness and perceived value have a positive impact on customers' attitude and trust in online shopping. In addition, both customer attitudes and trust have a positive impact on their tendency to shop on the internet.

Probation of the Private Enterprises' Informatization in Wenzhou

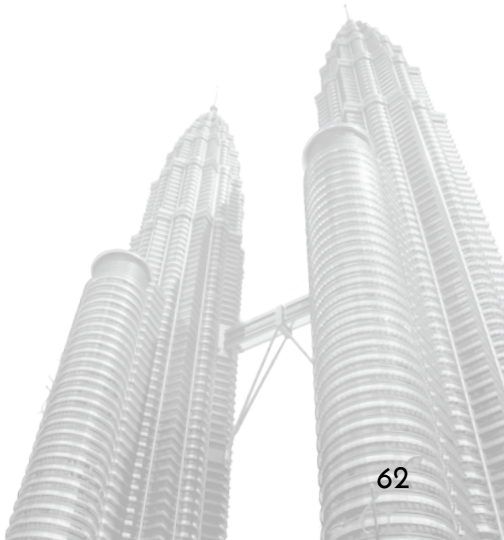
Jindong Li, Jixuan Feng
Zhejiang Wanli University, China

The case studies and questionnaire were employed in this paper to research private enterprises' informatization in Wenzhou, PRC, which are mainly family-run enterprises. It is found that the ability of information application will directly affect the overall operation of the enterprise. Currently the informatization of single respect has become mature, the same as partial application of IT. However on the level of collaborative and integration there still has a long way to go. Some issues such as shortage for IT professional staff, the blind management and insufficient support of government still exist.

Cloud Manufacturing for a Service-oriented Paradigm Shift

Yuqian Lu, Xun Xu
University of Auckland, New Zealand

Manufacturing industry is undergoing a major transformation from production-oriented business to service-oriented business, inspired by the advancement of smart technologies and sophisticated demand for product-service systems from the dynamic market. Cloud manufacturing is emerging as a key enabler for manufacturing companies to deliver highly customisable services over the Internet. This paper aims to investigate how cloud manufacturing systems is able to facilitate effective service-oriented business. Major challenges in developing a cloud-based manufacturing marketplace are discussed. A system framework for cloud-based service provision is proposed.



Session	Reliability & Management Engineering
Date	11/12/2014
Time	11:00 - 12:30
Room	Kaywest
Chairs	David Valis, Sanjay Kumar Palei

Software Hazard Rate Modeling with Multiple Change-Point Occurrences

Shinji Inoue, Shigeru Yamada
Tottori University, Japan

We propose a software hazard rate modeling framework with the effect of multiple change-point occurrences for developing more plausible software reliability growth models reflecting actual environment in the testing-phase of a software development process. Especially, our modeling approach enables us to develop a software hazard rate model with the effect of multiple change-point occurrences by assuming the hazard rate before the first change-point occurrence. Finally, we conduct goodness-of-fit comparisons of our multiple change-point model with the corresponding non-change-point model by using actual data.

Reliable System Design Under Uncertainty

Mengqi Li, Minghong Han, Jiaqi Xu
Beihang University, China

System design often concerns performance while ignoring reliability, leading to a satisfactory but unreliable outcomes. To overcome this problem, system design combining reliability allocation is proposed, and implementing under uncertainty. Analytical target cascading (ATC) is used as the basic framework to conduct the procedure using a sequential optimization and reliability assessment (SORA) method. ATC could decompose system into a multilevel structure corresponding to its reliability model, and SORA improves the efficiency of the whole design optimization. The gist of proposed method is to involve reliability into variable set and operate optimization in such ATC multilevel system under probabilistic uncertainty, resulting in coordinated system design and reliability allocation. By this mechanism, reliability affects design to obtain a compromise. At last, a structural missile problem is tested to validate the effectiveness of proposed method.

Integration of Failure Prediction Bayesian Networks for Complex Equipment System

Weitao Si, Zhiqiang Cai, Shudong Sun, Shubin Si
Northwestern Polytechnical University, China

With the advantages of the modularization concept, this paper proposes an integration modeling method of failure prediction Bayesian network (FPBN) to deal with failure prediction problem of complex equipment system. First of all, the definition of failure prediction Bayesian network module (FPBNM) is introduced and described. Then, when the complex equipment system is decomposed into some subsystems and represented with a set of related FPBN models, the corresponding modularization method of FPBN to FPBNM and the integration method of FPBNM models are discussed in details. Moreover, based on the super node mode of integrated FPBN model, this paper proposes a convenient and efficient inference algorithm. Finally, the case study of FPBN integration for an airplane head up display (HUD) system is carried out. The result shows that the proposed integration method of FPBN could build and inference the practical model efficiently for such complex equipment system.

Prediction of Vehicle further Operation and Fault Based on Tribo-diagnostic Data

David Valis[1], Libor Zak[2], J. Chaloupka[3]
[1]*University of Defence, Czech Republic*
[2]*University of Technology, Czech Republic*
[3]*Military Technical Research Institute, Czech Republic*

The paper deals with the application of selected analytical methods for analysing field data from heavy off-road military vehicles. The information from the engine oil is interpreted in a form of polluting particles like particles from a wear process (e.g. Fe, Pb, Cu, etc.) and particles from oil deterioration itself (like Mn, Si, Zn, etc.). These data have good technical and analytical potential which has not been explored well yet. A reasonable set of vehicles and their oil data from in-field-operation are available. Taking into account data processing we assume it will be possible to determine some changes. This may help to modify e.g. a system maintenance policy, estimate system operation and help with mission planning.

Estimation of System Residual Useful Life Based on Selected Tribo Data

David Valis[1], Ondrej Pokora[2]
[1]*University of Defence, Czech Republic*
[2]*Masaryk University, Czech Republic*

The aim of the article is to estimate a system residual technical life. When estimating a residual technical life statistically, a big amount of tribo-diagnostic data is used. Data 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. They are Ferrum (Fe) and Lead (Pb). By modelling the occurrence of particles in oil we expect to determine the adequate moment to perform preventive maintenance and the length of residual system useful life. The way of modelling is based on the specific characteristics of diffusion processes, namely the Ornstein-Uhlenbeck process. Following the modelling results we could set the principles of "CBM - Condition Based Maintenance". However, the possibilities are much wider, since we can also plan operation, mission and reduce life cost.

Session	Project Management II
Date	11/12/2014
Time	13:30 - 15:00
Room	Kaywest
Chairs	Thierry Coudert, Premaratne Samaranayake

Knowledge Transfer in Project-based Organizations. A Conceptual Model for Investigating Knowledge Type, Transfer Mechanisms and Transfer Success

Corro van Waveren[1], Leon Oerlemans[2], Marthinus Pretorius[1]
[1]*University of Pretoria, South Africa*
[2]*Tilburg University, Netherlands*

Knowledge transfers across projects in Project-Based Organizations (PBOs) are more complex and challenging than in the permanent organizational context due to the temporary nature of project teams in which team members do not see capturing and transferring across projects as important for long term benefits to the organization. Although knowledge transfer is well researched, few empirical studies have covered the implementation of knowledge transfer across projects in project-based organizations. To gain an overview of the knowledge transfer process in PBOs, a systematic literature review is conducted to the three theoretical concepts of interest in this study, namely knowledge type, transfer mechanisms and transfer success. The literature review identified several dimensions under each theoretical concept. Subsequently a conceptual model with two propositions is proposed for future empirical study in the relationships amongst the three theoretical concepts.

A Conceptual Multi-dimensional Evaluation Model for New Product Portfolio Management – Using Hybrid Fuzzy Model of AHP-DEA

Kiranmayi Pulipaka, Muthu Mathirajan
Indian Institute of Science, India

Even a best performing industry requires a major improvement in project selection methods as nearly half of initial new product development ideas occur informally or without a specific goals. In an industry, for efficient selection of projects it requires trade-off among maximizing revenues, optimizing resources and minimizing risks. The objective of this paper, is to study and identify an efficient metrics to measure respective evaluative dimension; and develop a conceptual model for selection and evaluation of a set of projects for New Product Portfolio Management (NPPM). In this paper, a hybrid fuzzy model of AHP-DEA is developed. This model assist decision maker, to select the right set of projects with higher development potential to maximize profitability and minimize the associated risk.

A Recommendation on PLUS Highway Development: A Social Network Analysis Approach

Norhaidah Mohd Asrah[1], Maman Abdurachman Djauhari[2]
[1]*Universiti Tun Hussein Onn Malaysia, Malaysia*
[2]*Universitas Pasundan, Indonesia*

Road development is one of the important elements for the overall economic and social development in the world. A better interconnected road network is crucial to increase the economic activities, such as trade. Highway, as the backbone of a country's transportation system, are required to overcome the demand for efficient road transportation. Besides, highway development is part of the government commitment towards the development of road network. In this paper, the network analysis of PLUS highway development was studied. The data used were based on the number of vehicles that entered and exited each toll plazas from Penang to Johor. The relationships between the toll plazas were studied by using minimum spanning trees and the overall centrality measures were used to determine the most influential toll plazas among the states. Based on the results, some recommendations are forwarded to the PLUS highway to improve the services and to increase the traffic efficiency.

Evaluating Risk Factors in the Operation of Virtual Teams in ICT Projects

Nikos Rassias[1], Konstantinos Kirytopoulos[2]
[1]*National Technical University of Athens, Greece*
[2]*University of South Australia, Australia*

Advancements in communications technology, coupled with the remarkable difference of labour costs among countries, has fostered the delivery of projects through virtual teams. The purpose of this research is the development of an evaluation tool that can assist a project manager assess the operation of a virtual team. The proposed tool, mainly based on an intra-team survey, evaluates risk factors that may inhibit the performance of the team and thus affect project objectives. The research followed the literature review and the case study approach, where an evaluation tool was produced, run and validated. The literature review revealed that the thematic areas mostly related to risk factors of virtual teams delivering ICT projects are: a) teamwork, cohesion, trust b) internal processes c) communications and d) politics, ethics, culture. The main finding from the case study was that the evaluation tool may reveal risk factors that have not been identified by the project manager.

Instructional Design for Online Course Delivery in Engineering Management: Synthesizing Learning Styles, Pedagogical Perspectives and Contingency Factors

Senevi Kiridena[1], Premaratne Samaranayake[2], David Hastie[1]
[1]*University of Wollongong, Australia*
[2]*University of Western Sydney, Australia*

Online course delivery can not only help meet the increasing flexibility demanded by students, but also enhance collaborative learning. Moreover, online delivery allows access to students and markets that are not served through the traditional face-to-face delivery mode. Despite these potential benefits, and the opportunities created by the advancements in information and communications technologies, there are still many barriers to the market penetration of online education programs. This paper explores the implications of learning theories, pedagogical aspects and other contingency factors for instructional design in the context of online delivery of tertiary courses. A synthesis of extant knowledge pertaining to these perspectives is presented in the form of an integrated conceptual framework for guiding future work.

Identifying Critical Project Management Techniques and Skills for Construction Professionals to Achieving Project Success

Jui-Sheng Chou, Ngoc-Tri Ngo
National Taiwan University of Science and Technology, Taiwan

This paper provides valuable information about the effectiveness of Project Management Body Of Knowledge (PMBOK) by evaluating performance of knowledge practice in the Taiwan construction industry. The surveys are analyzed by structural equation modeling to test the relationship between PMBOK techniques/tools/skills (TTS) and project success (PS). Importance-performance analysis (IPA) is presented to determine the priority of PMBOK TTS and the indicators that influence PS. The IPA can help construction practitioners to implement effective managerial strategies, enhance project performance, and improve the efficiency of the use of management resources, thus promoting project success. This empirical study reveals that construction practitioners can develop management knowledge to increase the likelihood of project success based on the identified important TTS and their perceived performance.

Session	Systems Modeling & Simulation II
Date	11/12/2014
Time	15:30 - 17:00
Room	Kaywest
Chairs	Syafiie Syafiie, Aini Zuhra Abdul Kadir

An Ising-based Approach to the Study of Inter-organizational Team Dynamics

Ilaria Giannoccaro, Ilario De Vincenzo, Giuseppe Carbone
Polytechnic University of Bari, Italy

In this paper inter-organizational teams are analyzed using the social network perspective, identifying three types of networks, i.e., the hierarchical, the knowledge, and the friendship ones. The main team dynamic concerning how team members change opinions is investigated by employing the Ising model of social interactions, with the aim of investigating the team performance in terms of conflict reduction and final level of agreement. A simulation analysis is carried out to assess the effect of the environment as well as of the team size, the density, and the connectivity of the social networks, on team performance. Results confirm that the team size, the network density and a random connectivity positively impact team performance, while environmental turbulence negatively affects the team performance.

Individual Versus Integrated Simulation Techniques in Healthcare Applications

Mohammed Abdelghany[1], Amr B. Eltawil[2]
[1]*Egypt-Japan University of Science and Technology (E-JUST), Egypt*
[2]*Egypt - Japan University of Science and Technology (E-JUST), Egypt*

This paper compares between the individual and integrated simulation models used in the healthcare context. The paper focuses on the individual models using Agent-Based Simulation (ABS), Discrete Event Simulation (DES), and System Dynamics (SD), in addition to the integrated approaches as well as hybrid simulation, considering the advantages and limitations for each technique and the simulation software packages used for modeling. We demonstrate the advantage of the integrated approaches over the individual approaches. Integrated approaches help in modeling more complex healthcare systems and overcome the individual methods limitations. The paper concludes by a suggested framework for integrating the three methods in modeling of emergency rooms in order to achieve new objectives and improve performance.

CFD Analysis of Chlorine Gas Dispersion In Indoor Storage: Temperatures with Wind Velocities Effect Studies

Mohsen Safakar, S Syafiie, Robiah Bt. Yunus
Universiti Putra Malaysia, Malaysia

Most of the industrial chemical products encounter natural environmental risk in the process. The indoor release of hazardous dense gases is especial topic for discussion nowadays because the clouds of heavier gases have a tendency to stay near the ground level, causing fatal and injuries the people. In this article a computational fluid dynamics (CFD) code FLUENT was employed in order to model the accidental indoor dispersion of chlorine from a small undetected leak in an indoor industrial space. The results of simulation represented that the chlorine gas spread would behave like liquid and flows on the floor, also the concentration of chlorine increased to above the ground level slowly. The effects of various temperatures and wind velocities on dispersion of heavier gas will help to better identify the potential risks. In this paper, the effects of the environmental situations with the release and spread of chlorine in the indoor space were meticulously examined.

Depicting Product-service Systems in the Early Phase of the Product Development

Daniel Kammerl[1], Martin Enseleit[1], Robert Orawski[1], Danilo Marcello Schmidt[2], Markus Mörtl[1]
[1]*Technische Universität München, Germany*
[2]*Technical University of Munich, Germany*

Especially the early phase of the innovation process, the planning phase, is characterized by extensive decisions and a wide range of uncertainty. Hence, it is essential for product designers to understand future Product-Service System characteristics and prospective properties. Thus, in this paper we present a framework for depicting a Product-Service System model throughout the planning phase of the innovation process based on existing methodologies in product and service modeling The user of the framework should be supported in decision making and keeping the overview during the early phases of product development so crucial decisions can be made on a conceptual and reasonable basis.

No Clutch Fuzzy Logic-controlled Hybrid Transmission

Essam Esmail[1], Hamed Hussain[2], Rahman Hussain[2]
[1]*University of Al Qadissiyah, Iraq*
[2]*Middle Technical University, Iraq*

This work presents a proposed design of a fuzzy logic-controlled hybrid transmission with only one electric motor/generator (MG) and without any rotating clutches. The proposed hybrid transmission serves to regulate the engine's effective gear velocity by mixing the engine and electric MG powers through a power controlling device. With a control unit, four major modes of operation excluding a regenerative braking capability are shown to be feasible in the proposed hybrid transmission; electric motor mode, engine mode, engine/charge mode, and power modes. Continuously variable transmission (CVT) capability is provided with the engine/charge mode and with the power mode. The power mode can be further subdivided into three hybrid sub-modes that correspond to the direct drive, under-drive, and over-drive of a conventional automatic transmission. The feasibility of the proposed hybrid transmission is demonstrated with a numerical example employing a simple gear train. All the driving conditions of the vehicle are studied and identified. The design is implemented using fuzzy logic and simulated in MATLAB/ Simulink.

Fractional Order PI Controller for Wind Farm Supervision

Boualem Benlahbib[1], Noureddine Bouarroudj[1], Farid Bouchafaa[2], Bachir Baton[1]
[1]*Unité de Recherche Appliquée en Energies Renouvelables, URAER, Algeria*
[2]*Laboratoire d'Instrumentation, Faculté d'Electronique et d'Informatique USTHB, Algeria*

Nowadays, the research related to the wind farms is oriented to the development of supervision algorithm to manage the active and reactive powers as well as to provide an ancillary system. This paper proposes Fractional Order Proportional integral [FOPI] Controller algorithm for wind farm supervision. This control system is based on two control levels: A supervisory system controls active and reactive power of the whole wind farm by sending out set points to all wind turbines, and a machine control system ensures that set points at the wind turbine level are reached. The whole control is added to the normal operating power reference of the wind farm established by a Supervisory Control. Finally obtained Results by this controller are also compared with the conventional PI controller through simulation results considering a wind farm of three generators DFIGs (1.5 MW).

Multi-objective Genetic Algorithm in Green Just-in-time Logistics

Ashkan Memari, Abdul Rahman Abdul Rahim, Robiah Ahmad
Universiti Teknologi Malaysia, Malaysia

This paper addresses a mixed-integer linear programming model by integrating just-in-time delivery along with green objectives in a logistics network. Multi objective genetic algorithm optimization has been applied in order to minimize the number of delivery and lead-time as well as environmental impact of logistic network. This evolutionary based algorithm incorporates non-dominated sorting genetic algorithm, so as to allow heuristic for parallel optimization of the objective functions. Computational results demonstrate efficiency of the proposed model for minimizing the objective functions. Finally, the conclusion and some areas of further research are proposed.

Session	Safety, Security & Risk Management
Date	11/12/2014
Time	09:00 - 10:30
Room	Cancun
Chairs	Netai Chandra Karmakar, Elena Rokou

A Taxonomy of Security and Privacy Requirements for the Internet of Things (IoT)

Israa Alqassem, Davor Svetinovic
Masdar Institute of Science and Technology, United Arab Emirates

Capturing security and privacy requirements in the early stages of system development is essential for creating sufficient public confidence in order to facilitate the adaption of novel systems such as the Internet of Things (IoT). However, security and privacy requirements are often not handled properly due to their wide variety of facets and aspects which make them difficult to formulate. In this study, security-related requirements of IoT heterogeneous systems are decomposed into a taxonomy of quality attributes, and existing security mechanisms and policies are proposed to alleviate the identified forms of security attacks and to reduce the vulnerabilities in the future development of the IoT systems. Finally, the taxonomy is applied on an IoT smart grid scenario.

Friction Measurements on Floors Under Solid Contaminated Conditions

Kai-Way Li, T-Y Pei
Chung Hua University, Taiwan

Slip and fall incidents are common. Lack of Friction on the floor has been identified as one of the leading contributors for slipping and falling incidences. Friction between the shoe and floor may be measured using a slipmeter. The purpose of this study was to investigate the effects of the floor roughness, shoe sole tread and surface conditions of the floor on friction coefficient. The surface conditions included dry, wet, and solid contaminated conditions. For dry surfaces, dry clean floors were tested. For wet surfaces, water was poured on the tested floors to simulate the wet condition. The solid contaminated conditions included floor covered with emery particles of 7 different sizes (from 50 ÎĽm to 2000 ÎĽm). Friction measurements were conducted in the laboratory. The results showed the solid particles provided more hazardous conditions than water on the floor. Large particles resulted in lower friction than smaller ones.

Understanding Hazards and Risks in Modern Sociotechnical Systems: Systemic Approach to Identify Human, Organizational and Technical Factors

Haftay Hailay Abraha, Jayantha P. Liyanage
University of Stavanger, Norway

A complex sociotechnical system has a large number of components, where complex interactions may lead to collective emergent behaviors that cannot, even qualitatively, be derived as a plain resultant from the individual components' behavior. To cope with such complexity, one needs to study all disasters from a common systemic perspective, so that one can thoroughly understand the commonalities as well as the differences, in order to better design and control such systems in the future. The motivation for this paper was the hindsight bias of the accident investigative reports associated with the Deep water Horizon and the Piper Alpha disasters. The accident analyses were based on simple and linear approaches which tend to blame operators instead of systemic identification of origins. This paper offers an alternative view using systemic thinking concepts to identify some of the human, technical and organizational factors which were believed to be the underlying causes for the Deep water Horizon, Piper Alpha and many other major recent disasters.

Effects of Demography and Occupational Traits on Consequence of Injury of Underground Coal Miners

Sanjay Kumar Palei, Netai Chandra Karmakar, Rutwick S. M. Reddy
Indian Institute of Technology (B.H.U), India

In spite of introduction of modern underground mining methods, mining is still a hazardous occupation. Different individuals are exposed to different levels of injury risk and injury severity due to individual and workplace characteristics. In this paper, accident data of three Indian underground coal mines were collected. The analysis was done based on consequence of injury (in terms of man-days lost) with due emphasis on age, occupation, cause, skill and body parts injured. The relative risk of various contributing parameters was estimated using multinomial logistic regression analysis. The results reveal that age of the worker, skill of the worker and the cause of injury bear no significant relation on consequence of the injury. It is observed that the relative risk of occurrence is mine specific. The limbs are the most vulnerable parts of the body causing highest number of man-days lost.

Risk Analysis and Rescue Operation for Machine Roomless Lift: A Case Study

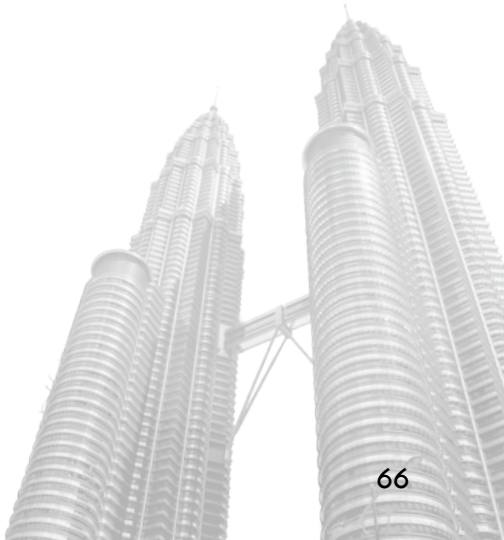
Choo Yong Lee[1], Chin Huat Lim[2]
[1]*Robert Bosch Sdn. Bhd., Malaysia*
[2]*Shinyou Elevator Manufacturing Sdn. Bhd., Malaysia*

We analyze potential risks of machine roomless lift at system design level by evaluating risk rate (R) which is a combination of occurrence (O) and severity of specific risk (S). Risks during installation, testing and commissioning of lift, maintenance and rescue operation which might endanger life of person are considered. Our study include identify risk, determine risk rate and formulate control measure to reduce risk rate to acceptable value by applying extensive field experience and sound engineering know how in lift system. We also develop comprehensive rescue operation flow which would be useful guide for generic MRL system design as there are no much literatures in this topic.

Modeling of Tolerable Repair Time Without Affecting System Reliability

Aishwarya Mishra, Pranab Murari, Sanjay Kumar Palei, Suprakash Gupta
Indian Institute of Technology (B.H.U), India

Ideally, it is assumed that a system fails as soon as one of its components connected in series has failed. However, in many real-world system configurations do not allow the system failure immediately when a fault or component failure occurs, rather its reliability falls down at a faster rate, and soon the system fails prematurely. If the fault is rectified or the failed item is repaired within a specified time limit, system reliability curve is restored to its normal decreasing trend. The time gap, between the failure of a component or occurrence of a fault and the repair of the component or rectification of a fault so that no system failure, is observed and it is very important that the system reliability decreases at its normal rate. This allowable time gap can serve a guiding tool to the maintenance policy and management decisions. This paper proposes a reliability and maintainability based approach for calculating the grace period, commonly known as the tolerable repair time of a system component. The proposed model has been demonstrated for a belt conveyor system, used for transportation of mineral in the mines. The allowable repair time of the idler of the belt conveyor system was calculated using the cumulative failure distribution function.



Session	Production Planning & Control II
Date	11/12/2014
Time	11:00 - 12:30
Room	Cancun
Chairs	Ahmed El-Bouri, Bholanathsingh Surajbali

Planning and Scheduling across the Supply Chain: Simulation-based Validation of the Unitary Structuring Technique

Premaratne Samaranayake[1], Senevi Kiridena[2], Dalin Cai[2]
[1]*University of Western Sydney, Australia*
[2]*University of Wollongong, Australia*

Despite long-standing and ongoing research efforts, integration of planning and scheduling across the supply chain continues to be a major challenge. Limitations of the existing advanced planning systems in this regard have been widely cited in literature. This paper presents the results of the simulation-based validation of an alternative framework that addresses these limitations. The proposed framework, which is based on the â€œunitary structuring techniqueâ€™ was shown to have the functionalities required to deal with simultaneous planning of materials and resources, dynamic forward planning of activities and finite capacity loading of resources. However, to demonstrate the robustness of this framework, future research should focus on developing and testing a wider range of scenarios and incorporating more complex supply chain applications.

Optimal Planning of Biodiesel Supply Chain Using a Linear Programming Model

Maryam Valizadeh, Syafiie Syafiie, I.S. Ahamad
University Putra Malaysia, Malaysia

This paper presents a method for improvement of economic performance of biofuel supply chain. A mathematical model is proposed for optimal planning of biofuel supply chain in order to minimize the total operational costs. The model is linear and takes into account the availability of feedstock and biorefineries and determines the optimal schedule for harvesting and transportation of biomass feedstock, biodiesel production and distribution over the planning horizon. The model is applied to a case study for production of biodiesel from palm oil and jatropha in Malaysia.

A Simple Multiple Objective Linear Programming Model on Customization Manufacturing for Metal Steel Making Effectiveness

Earl-Juei Wang[1], Chin-Shih Tsou[2]
[1]*National Pingtung University of Science and Technology, Taiwan*
[2]*National Taipei University of Business, Taiwan*

Metal steel making currently faces the trend of customization and batch production resulting in difficulties of cost control. This study develops a simple multiple objective linear programming (MOLP) method to formulate a manufacturing decision model with cost minimization for steel making procedures. Operations data collected from manufacturing procedures were accordingly transferred into the model and therefore manufacturing decisions can be made. Cost factors considered in the model were materials, outsourcing, manufacturing, and manpower. To make the model more applicable, costs related to rework and overtime were also included. In consideration of energy consumption, the proposed model was formulated as minimizing two objectives of total cost and energy use.

Mixture of Two Different Scheduling Policies in a Class of Discrete Event Systems

Hiroyuki Goto, Hajime Yokoyama
Hosei University, Japan

This research develops a scheduling framework for a class of discrete event systems. We use max-plus algebra for formulating the constraints of target systems. Two types of scheduling policies can coexist within a single job in the framework. One policy focuses on cases whose precedence relations of tasks can be represented by a directed acyclic graph, whilst the other policy the relative start and completion times can be represented by a strongly connected graph. These two policies have been handled in different frameworks heretofore, and this research thus aims to unify these without introducing a new construct for specifying required parameters.

A Cloud-based Approach for Collaboration of Serviced-enhanced Products

Bholanathsingh Surajbali, Adrian Juan-Verdejo, Holger Baer, Spiros Alexakis, Gerald Hübsch, Markus Bauer
CAS Software AG, Germany

The rise of cloud computing is radically changing the way Small and Medium Enterprises (SMEs) manage their information technology assets. In order to provide innovative services, association of SMEs' can strategically join their competencies to respond to business and collaboration opportunities. In this paper we focus on exploring the potential of utilising cloud computing to support a goal-oriented collaborative network by allowing organisations to collaborate on products and services in real-time. Furthermore, we believe our approach will enable organisations to collaborate on emergence of new products, and new services bringing together stakeholders to develop ideas and concepts that leverage to increase product and service innovation.

Session	Human Factors II
Date	11/12/2014
Time	13:30 - 15:00
Room	Cancun
Chairs	Perminderjit Singh, Chien-Sing Lee

Selecting a Shift System Based on the Analytical Hierarchy Process

Alexander Rannacher, Susanne Mütze-Niewöhner, Christopher M. Schlick
RWTH Aachen University, Germany

In the age of 24 hours a day, 7 days a week business it happens more often, that companies hire experts on working time, whose task it is to develop a new company-specific shift system. As a new shift system usually entails not only advantages but also disadvantages, often several new alternative shift systems are elaborated. Subsequently a panel of representatives of employers and employees are faced with the challenge to choose the "right" alternative. On the basis of a case study this paper exemplarily describes, how a good decision-making basis for the selection of a suitable shift system can be generated by applying the Analytical Hierarchy Process.

Differentiated Customer Needs' Analysis for User Experience

Danilo Marcello Schmidt, Josu Urquidi Guerrero, Ioanna Michailidou, Udo Lindemann
Technical University of Munich, Germany

The identification of attributes attractive for users is essential for creating a positive user experience with a product. For this, Kano's method classifies customer needs into different categories. Besides the attractiveness, the attribute's importance for the customer might be also relevant for User Experience. Thus, we combine Kano's method and the conjoint analysis for the identification of attributes, which are attractive and important for the user. Using this methodology, we are able to select the more favorable attribute of two attributes, which reached the same result in Kano's method. Furthermore, we apply this methodology on charging systems for electric vehicles as a case study. The results of the case study revealed the benefits of applying the methodology in analyzing customer needs.

Deriving the Relationship Between User Satisfaction on Engine Sounds and Affective Variable Sets Based on Classification Algorithms

Wonjoon Kim, Gawon Kim, Yushin Lee, Myung Hwan Yun
Seoul National University, South Korea

This study aims to extract the most relevant set consisted of affective variables to the level of user satisfaction on engine sounds using classification algorithm. The affective variables for engine sounds were defined by three axes, and two classification algorithms were used to determine the prediction accuracy for those affective axes. The study was consisted of three phases: 1) collecting affective variables, 2) preprocessing of engine sounds and experiment design, and 3) analysis of the most relevant sets of affective variables to user satisfaction. As a result, PA (Powerful-Affective) variable set showed the highest prediction accuracy of user satisfaction compared to other sets. Predicting the level of satisfaction based on classification algorithm could help to generalize the relationship between user satisfaction and affective variables more easily, beyond the limitation with a small size of subjects.

Gesture Interface Appropriateness Analysis on Smart TV Functions

Jaehong Lee, Byungki Jin, Soo-chan Jee, Jiyoon Han, Myung Hwan Yun
Seoul National University, South Korea

The aim of this study is to examine the types of commands are appropriate to gesticulate when controlling a smart TV. The experiment was conducted to see the relationship between 'gesture-appropriate score' and 'function variables'. For the experiment, eighty-seven commands of smart TV were extracted and three function variables ('frequency', 'depth', 'type') were selected. Also, the levels of each function variable were classified. Gesture-appropriate scores were significantly different between the levels of each function variable. The optimal levels of each function variable were suggested by conducting conjoint analysis. From the results, we found that high frequency level, low depth level, navigation/move type functions were preferred as a gesture interface. With the results of this research, the gesture interface designers are able to consider the priority of function variables for designing gesture interface.

Employee Involvement and Training in Environmentally Conscious Manufacturing Implementation for Indian Manufacturing Industry

Perminderjit Singh[1], Kuldip Singh Sangwan[2]
[1]*PEC University of Technology, India*
[2]*Birla Institute of Technology and Science, Pilani, India*

Employee involvement and employee training are most important and vital principles for the successful implementation of any newer manufacturing system or modern practice in any organization because the newer systems/practices require changed roles for people at all levels. The general human tendency to resist change understood properly may lead to dysfunctional implementation of newer systems/practices. Environmentally conscious manufacturing (ECM) being a new paradigm in manufacturing requires the changed roles for employees. The management must have measures to convince the shareholders that the plan to implement ECM has taken care of changed roles of people. This paper identifies the employee involvement and employee training measures for the successful implementation of ECM. The identified measures have been validated by a case study of Indian large scale enterprises. The measures identified from the literature have been validated by using SPSS for Windows statistical tool. The reliability and validity of the data has been assessed by the Cronbach alpha and factor analysis respectively. The results provide sure evidence that the identified measures are highly reliable and valid.

A Toolkit Based on NK Fitness Landscape for Behavioral Investigation in Complex Supply Chains

Ilaria Giannoccaro
Politecnico di Bari, Italy

This paper provides a toolkit based on NK fitness landscape to model complex supply chains and to carry out behavioral research analyzing the impact of decision makersâ€™ behaviors on supply chain management. Whereas this methodology has been largely applied in organizational studies, very few applications exist in supply chain contexts. Main research questions that could be addressed by means of the proposed methodology are also outlined.

Session	Intelligent Systems II
Date	11/12/2014
Time	15:30 - 17:00
Room	Cancun
Chairs	Samreen Amir, Chin Yuan Fan

A Priority Based Optimization Algorithm for Multi-objective Integrated Process Planning and Scheduling Problem

Muhammad Farhan Ausaf, Xinyu Li, Liang Gao
Huazhong University of Science and Technology, China

Process planning and scheduling are two fundamental elements of a modern manufacturing system. Their effective integration is very important for increasing productivity and overall efficiency of a manufacturing system. Given that a single objective cannot effectively describe real world problems and numerous key parameters must be considered by decision makers to determine the performance of a manufacturing system, multi-objective optimization is important for integrated process planning and scheduling (IPPS) problem. In this paper a priority based optimization algorithm is presented for multi-objective optimization of IPPS problem. The algorithm uses a priority based mechanism, inspired by use of dispatching rules, to effectively guide the search towards Pareto optimal points for a multi-objective IPPS problem. An external archive is used to store the non-dominated solutions. The proposed algorithm has been tested for three different instances presented in recent literature. Experimental results suggest that the proposed algorithm is quiet capable of producing improved solutions.

The Knowledge Sharing Model on Supply Chain Simulation Using Recurrent Neural Network

Fumiaki Saitoh
Aoyama Gakuin University, Japan

The bullwhip effect is one of the most important problems on the supply chain management. It is a phenomenon that fluctuation in demands increases on upstream of supply chain. Inaccurate demand forecasting accompanying lack of communication is well known as a cause of bullwhip effect. Nevertheless, there is almost no sufficient argument on the influence of the bullwhip effect on demand forecasting through communication with business contacts. In this paper, we propose the framework and simulation model of supply chain system based on demand forecasting through communication with business contact. Here, the simulation model was constructed by modeling about the past transaction data as knowledge sharing with business contacts' company. Recurrent neural network that is excellent in time-series prediction was used for demand forecasting in this simulation. We confirm the effectiveness of our proposal through comparative experiments using inventory management simulation on conventional models and on proposed model.

Implementation of Line Tracking Algorithm using Raspberry Pi in Marine Environment

Samreen Amir[1], Ali Akbar Siddiqui[2], Nimrah Ahmed[2], Bhawani Shankar Chowdhry[3]
[1]*Hamdard University, Pakistan*
[2]*Sir Syed University of Engineering & Technology, Pakistan*
[3]*Mehran University of Engineering & Technology, Pakistan*

In recent days it is necessary to maintain continuous surveillance of underwater transmission lines or oil pipelines. For such purpose, we require an underwater vehicle rover capable of tracking these wires or pipelines and detect the fault if it occurs. For this purpose we have designed an intelligent quad leg rover. Image processing as a key deployed for tracking and tracing the fault or damage. Hough's Transformation is used for the detection of the wire, and threshold levels were also set of the underwater environment for vehicle to focus only on wire. For tracking the transmission lines and proper navigation, we have used a masking technique. The system is implemented on Raspberry pi (Broadcom BC2835) as well as Intel Core Processor T7250 to improve and analyze the performance in terms of size and mobility. The results presented in this paper are simulated on Intel T7250 processor and on raspberry pi. It helps in evaluating the response time of the raspberry pi when compared to any other processors in terms of computation and robustness.

Physical Layer Design of Optical Networks with Practical Considerations

Kin Fan Poon[1], Anis Ouali[1], Beum Lee[2]
[1]*Khalifa University of Science, Technology and Research, United Arab Emirates*
[2]*Etisalat British Telecom Innovation Centre, United Arab Emirates*

Nowadays, many telecom operators consider fiber-based access networks as a major solution to provide bandwidth hungry services such as High Definition TV over IPTV, online gaming, video streaming, high speed Internet, etc. However, today's telecom market is facing tough competitions with very tight budget and limited human resources. Return on investment for the deployment of new networks or transformation of legacy networks to fiber-based networks need to be maximized. One way to minimize the capital expenditure (CAPEX) costs is through automation of the network design. Not only can it reduce the time and the cost of manual design but it can also optimize the design with a minimum cost. In this paper, our network planning system based on the mixed integer linear programming (MILP) approach is proposed with the main focus on solving practical scenarios which are related to design constraints with clear boundaries of planning areas. Advantages of having clear boundaries from the practical point of view are discussed in detail and the model to solve this problem is provided.

Developing Target Marketing Models for Personal Loans

Jen-Ying Shih[1], Wun-Hwa Chen[2], Yu-Jung Chang[3]
[1]*National Taiwan Normal University, Taiwan*
[2]*National Taiwan University, Taiwan*
[3]*Academia Sinica, Taiwan*

Personal loan marketing is a critical decision for a commercial bank's development of its consumer finance business in Taiwan because this business comprises majority of the bank's revenues. Efficiently and effectively reaching customers who have a high level of intention to borrow money is an important goal of banks in such marketing campaigns. The purpose of this research is to assist a commercial bank in developing a marketing model for estimating customers' intention to apply for personal loans from a market segment of customers who has already used the other banks' revolving credit of credit cards and are thus considered as potential customers for personal loans. Data mining techniques, including logistic regression, decision tree, neural networks, and support vector machines, are adopted in the model development. This research yields some interesting findings and demonstrates the effectiveness and efficiency of data mining in developing target marketing models for commercial banks.

Developments and Trends in Shopfloor-related ICT Systems

Olaf Sauer
Fraunhofer IOSB, Germany

Features of shopfloor-related ICT or manufacturing execution systems are and will remain indispensable even in Industrie 4.0 â€“ the industry after the forth industrial revolution. In practical operations, however, managers repeatedly wonder what development trends will appear in the automation pyramid and how shopfloor-related ICT systems will be enhanced in the future. The presented article will highlight some of the major trends.

Session	Poster Session
Date	11/12/2014
Time	15:00 - 15:30
Room	Jamaica

A Study on RFID-based Kanban System in Inventory Management

Alireza Ghelichi, Ahmed Abdelgawad
Central Michigan University, United States

Using technology has been widely expanded in our contemporary world, Radio Frequency Identification (RFID) is one of the most recent methods that is widespread through different areas. RFID has multiple considerable applications with continues advantages such as batch readability, process capability, resistance to harsh environment and information storage. However recent researches are challenging RFID capability and its advantages in supply chain. In this paper we will go through multiple of these challenges and study how they can be solved and turn in to RFID benefits. In addition, we will discuss the inventory management and its importance for a firm and we will showhow RFID technology can be used there. Moreover,we will introduce a study about application of RFID on Kanban inventory approach. This study will evaluate the opportunity of using RFID-based Kanban inventory management over two-bin Kanban inventory management.

The Economic Analysis Model of Operations Strategy

Chun-Ying Shen
Chien Hsin University of Science and Techology, Taiwan

Most of the published research employed qualitative methods regarding a decision of operations strategy. This study attempts to explain operations strategy selection in terms of the optimal coordination of interactions among departmental business functions. This study applies an economic analysis model (EAM) for clarifying the fitness of individual operations strategies. The expected benefits of coordinating the cross-function integrations, the benefits of a new production process, and the opportunity costs of the original process are considered in this model. The executive manager is authorized to determine the risk parameter of individual strategies based on their expertise and a specific decision environment in the proposed model. The efficacy of the proposed model is demonstrated through discussion.

Solving an Economic and Environmental Dispatch Problem Using Evolutionary Algorithm

Forhad Zaman, Ruhul Sarker, Tapabrata Ray
University of New South Wales, Australia

For successful operation of any power system, an effective scheduling of power generation is crucial. In this paper, we consider a power system with two types of generators, thermal and hydro. The characteristics of these generators vary with respect to the cost, emission to the environment, input source, capacity limit, and technological constraints. The mathematical model considering two objectives, such as minimization of the operating cost and minimization of total emissions, for a hydro thermal system is discussed. A solution approach has been proposed, based on evolutionary computation concept, for solving a benchmark problem for both single and bi-objective version of the problem. In the approach, an initial population of solutions is generated based on a heuristic and the population is then evolved using two well-known evolutionary search algorithms. The solutions of our approaches are compared with another approach from the literature. The analysis of the results reveals that the heuristic enhanced the performance of the evolutionary algorithms considered in this paper.

Message Sequencing of Rational and Emotional Appeals: A Study on Consumer Brand and Product Attitudes

Weng Marc Lim, Pei-Lee Teh, Pervaiz Khalid Ahmed
Monash University, Malaysia

Message sequencing is a promising area of research. This study sheds light on consumer attitudinal responses, namely attitudes toward the corporate and product brand, by examining the effects of sequencing rational and emotional appeals in marketing messages. Using a between-subjects experiment and a stratified random sample, the study found that using an emotional rational message sequence produces more favorable product brand attitudes among consumers as compared to using a rational-emotional message sequence. However, message sequencing had no significant effects on consumers' attitudes toward the corporate brand. Implications, limitations, and future research directions from the study's findings are discussed.

A Conceptual Neural Model for Business Selection in Multi Business Unit Firms

Saeed Khodamoradi, Jalal Abdellahi
Shahed University, Iran

Despite of its importance in the context of corporate portfolio management (CPM), business selection in multi business unit firms is still among ambiguous problems because of its sophisticated nature in which the effective decision rules are different from one firm, industry or country to another. Therefore this article tries to address the business selection problem in corporations by applying a two layer neural networks with sigmoid activation function as a pattern recognition supervised learning algorithm to recognize business selection patterns in different firms and make decision for adding or divesting new business units based on a set of quantitative features. The model trained, validate and tested and results were indicative that the model is relatively reliable for using in action.

A study on Developing the Indicators of Energy Conservation and Carbon Reduction for the Business

Liang-kong Lin[1], Walter Den[2], Ying-Chyi Chou[1], Ching-Hua Lu[3], Hsin-Yi Yen[4]
[1]*Tunghai University, Taiwan*
[2]*Tunghai Universit, Taiwan*
[3]*National Chiao-Tung University, Taiwan*
[4]*Tunghai University , Taiwan*

Green House Gas (GHG) emission has become a critical issue for firms to achieve sustainability. This paper propose an MCDM method combining Analytic Hierarchy Process (AHP) and Decision-making Trial and Evaluation Laboratory (DEMATEL) to recognize the crucial criteria which have dependence and causality. Eighteen criteria of GHG emission with six dimensions were selected from the literatures and modified by six experts of energy sector. The results showed that improve energy efficiency and reduce energy consumption are recognized to be the most influential dimensions of six. In addition, identifying the causality between six dimensions provide an insight for practitioners utilizing firmâ€™s resources in GHG emission more effectively

Optimal Inventory Policies for Remanufacturing Inventory Systems with Multiple Returns

Xue-Ming Yuan[1], Z. L, Tan[2], Amrik Singh Bhullar[1]
[1]*Singapore Institute of Manufacturing Technology, Singapore*
[2]*Nanyang Technological University, Singapore*

This paper considers a remanufacturing inventory system with multiple returns, and derives the optimal policies for its inventory replenishment. To adapt more generic industry applications, dynamic demands and returns are incorporated into the remanufacturing inventory system. The results show that the optimal policies are not independent among classes under certain state conditions. In addition, we also obtain the transition among the state conditions to give a clear picture on how the system behaves dynamically.

A New Conceptual Design Approach for Context-aware Product Service System

Dongping Chen, Xuening Chu, Yuliang Su, Dexin Chu
Shanghai Jiao Tong University, China

Smartphone with the ever increasing capacity and processing power provides a natural and ubiquitous platform for personalized intelligent services. Conceptual design plays an extremely crucial role in the process of smartphone service system development. Due to the spatial and temporal components of smartphone service usage, exiting approaches cannot support the conceptual design process of smartphone service system. A uniform conceptual design framework is proposed based on Axiom Design approach, which consists of customer domain, function domain and concept domain. UML based task model, B&P function model, modified service blueprint are introduced respectively in each domain to support the design process. To cope with time variance and location sensitivity of customer requirements, a new analyze method is proposed in three-dimensional space. The effectiveness of the proposed approach is demonstrated using a case study of business district.

Evaluation of Equipment Renewal Based on Combination Weighting Method

Lei Chen[1], Chunqing Wang[1], Xuedong Liang[1], Zhaoxia Guo[1], Da Wang[2]
[1]*Sichuan University, China*
[2]*Sichuan Aerospace Industry Group Co., Ltd, China*

In view of the problems that the enterprise equipment's updated and diagnosis works difficult to be quantified, a new equipment renewal method is proposed based on the analytic hierarchy process (AHP) and variation coefficient method. The indexes weight is determined by a

combination weighting way; furthermore, the fuzzy comprehensive evaluation method is introduced to analyze and calculate the portfolio weights and evaluation grades. Case study validates the effectiveness which is beneficial for equipment renewal management.

Applied Cognitive Psychology in Software Debugging Process to Predict Software Reliability Growth

Kuei-Chen Chiu
National Cheng Kung University, Taiwan

This study applied cognitive psychology in software testing/debugging process to predict software reliability by the time lag between error-detection and error renovation. This paper integrates the SRGMs of Chiu et al. using the time-varying learning effects [2] to measure the performance of error-detection and error-renovation in a software testing/debugging project for the data sets in Huang & Hung [8], this study also figure out the time lag between error-detection and error-renovation with time-varying learning effects and predict software reliability growth by the time lag. According to the results, the software testing/debugging managers can master the remaining time to remove errors and lift software reliability to the goal ahead of time based on errors-detection rate by improve learning effects. The results will help software system testing/debugging managers to shorten software testing time, save testing time, dominate the market by releasing software system ahead of time, and manage the software testing/debugging process more efficiently.

Assessing Survivability for Damaged Aircraft in the Combat Environment

Yang Pei[1], Tao Cheng[1], Min Xie[2]
[1]*Northwestern Polytechnical University, China*
[2]*City University of Hong Kong, Hong Kong SAR*

Recently, much effort has been devoted to the study of aerodynamic performance analysis for the damaged aircraft. Sometimes, we are more concerned about the specific value of survivability of damaged aircraft, which allows the analysts to plan combat operations. How to relate aerodynamic performance degradation to survivability when the aircraft is damaged is important for military operation research. In this study, the maximum level flight velocity and one-on-one encounter model serve as the bridge combining aerodynamic computation and survivability analysis together, an integrated survivability model of damaged aircraft is proposed. Two examples are provided to illustrate how the damaged wing affects the survivability of an aircraft. The proposed method is an attempt for quantitatively describing the relationship of aircraft survivability with the battle-induced damages affected by attach angel, flight altitudes, etc.

An Efficient Genetic Algorithm for Flexible Job-Shop Scheduling Problem

Ali Mokhtari Moghadam, Kuan Yew Wong, Hamed Piroozfard
Universiti Teknologi Malaysia, Malaysia

In this paper a genetic algorithm (GA) is developed to create a feasible and active schedule for the flexible job-shop scheduling problems with the aims of minimizing completion time of all jobs, i.e. makespan. In the proposed algorithm, an enhanced solution coding is used. To generate high quality initial populations, we designed an Operation order-based Global Selection (OGS), which is taken into account both the operation processing times and workload of machines while is assigning a machine to the operation which already is ordered randomly in chromosome operation sequence part. The precedence preserving order-based crossover (POX) and uniform crossover are used appropriately and furthermore an intelligent mutation operator is carried out. The proposed algorithm is applied on the benchmark data set taken from literature. The results demonstrated efficiency and effectiveness of the algorithm for solving the flexible job shop scheduling problems.

A Integrated Inventory Model with Imperfect Production and Inspection Under Trade Credit Financing

Chia-Hsien Su[1], Liang-Yuh Ouyang[2]
[1]*Tungnan University, Taiwan*
[2]*Tamkang University, Taiwan*

In this paper we develop an integrated inventory model with imperfect production and inspection process under two-level trade credit strategy. We assume both manufacturer and retailer adopt the marketing strategy of transactions on credit. Consumers' demand is affected by the length of credit period provided by retailer. The impact of imperfect production quality and inspection errors is incorporated in this paper. Mathematical models have been derived for obtaining the optimal solution so that the annual total profit is maximized. A numerical example is given to illustrate the results developed in this paper.

Least Cost Design of Green Buildings by Genetic Algorithms

Kang-Ting Tsai, Min-Lun Lyu, Min-Der Lin
National Chung Hsing University, Taiwan

In order to keep pace with the trend of "sustainable development", "green building" has become an important design concept in the construction industry. However, the envelope forms and materials of a green building are usually chosen based merely on the architects' experiences instead of on a systematic assessment method. This study employs genetic algorithms to find the least-cost designs for building shells which meet the requirements of a daily energy conservation index. The results show that genetic algorithms can successfully optimize the shell designs, and may be a useful tool for green building designs.

Performance Analysis of Autonomous Vehicle Storage and Retrieval Systems Depending on Storage Management Policies

Sascha Kaczmarek, Jonas Goldenstein, Michael ten Hompel
TU Dortmund, Germany

This paper deals with the influence of storage management policies on the performance of autonomous vehicle storage and retrieval systems (AVS/RS). Strategies like cross storage, access frequency based strategies, as well as path optimized and first in first out strategies were analyzed by using an AutoModTMbased simulation model. For each strategy the vehicle selection strategy was varied to identify existing interactions between the two sets of strategies. The physical components were not changed throughout the simulation study, except for the amount of used vehicles. The simulation results were analyzed with the aim of obtaining universally valid statements on the system behavior. The conclusion is that immense performance effects can be achieved by intelligent control of AVS/RS without changing the physical configuration. The increase in performance can be generated by several individual effects. Therefore, the design of each autonomous vehicle storage and retrieval system needs a by-case examination.

Integrating Fuzzy Logic to Systems Dynamics for Decision Support

Ifeyinwa Orji, Sun Wei
Dalian University of Technology China, China

Globally, supply chains compete in a complex and rapidly changing environment. Hence, sustainable supplier selection, an operation in green manufacturing environment has become a decisive variable in the firm's financial success. A major problem in sustainable supplier selection is not only to select sustainable suppliers but to insure suppliers maintain their behavior for a long period of time. This requires reliable tools and techniques to select the best sustainable supplier and enhance understanding about how supplier behavior evolves with time. System dynamics (SD) is an approach to investigate the dynamic behavior in which the system status alterations correspond to the system variable changes. Thus, this work presents a novel modeling approach of integrating information on supplier behavior in fuzzy environment with SD simulation modeling technique which results in a more reliable and responsible decision support system.

Effect of Inspirational and Motivational Leadership on Creativity and Innovation in SMEs

Wilson Maladzhi[1], Bingwen Yan[2]
[1]*University of South Africa, South Africa*
[2]*Cape Peninsula University of Technology, South Africa*

The purpose of this study is to identify the effects of inspirational and motivational leadership on creativity and innovation in South African Small and Medium Enterprises (SMEs). The leadership issues have been of major concern since the inception of democracy in 1994. Recent years, the spirit of creativity and innovation is suppressed and innovation culture is greatly affected among SMEs. It is critical for leaders to inspire and motivate employees to contribute new ideas and become more productive. A survey research was conducted from a group of employees (n1=366) and leaders (n2=57) within 50 SMEs in the Western Cape. A hypothetical model with the emphasis on inspirational and motivational leadership characteristics is developed. The findings indicated that the leaders did not fully show their inspirational and motivational capabilities and they disagreed with employees on empowerment, rewards for creativity, and support mechanism.

In Search of Measuring Organizational Culture: ICT Peculiarities

Maria Kütt, Mait Rungi
Tallinn University of Technology, Estonia

Organizational culture is an unambiguous term with long history, but without clear definition. There exists plurality of models, all of which

are rather old. The goal of this paper is to test the appropriateness of these mainstream models in contemporary business setting - in context of two ICT companies of Estonia, an innovation oriented small European Union country. As a result, the usefulness of the models is found to be industry-dependent. Not all models are found to be equally suitable for ICT. Goffee and Jones model is most suitable by bringing out most differences between companies. Harrison and Stoke's model is next with Cameron and Quinn's model being the least suitable.

Investigating Factors Behind Choosing a Cryptocurrency

Aamna Al Shehhi, Mayada Oudah, Zeyar Aung
Masdar Institute of Science and Technology, United Arab Emirates

This paper aims to address two challenging questions: "What are the bases on which online users choose to use and/or mine their cryptocurrency?" and "Which factors strongly affect the coin's popularity and value?" We try to answer these two questions for eight chosen cryptocurrencies by conducting an online survey. Results obtained from the online survey indicate that more than half of the participants believe that the currency name and logo affect the choice of using and/or mining a cryptocurrency. Moreover, the majority of the participants stated the ease of mining, having strong, fun and large community along with anonymity, privacy, and the currency's value, popularity, potential and technology as advantages of the currencies they choose to use and/or mine. These results help in observing the people behavior and predicting how successful and promising a cryptocurrency might become in the future.

Model of Human Reliability for Manual Workers in Assembly Lines

Yolanda Báez[1], Manuel Rodríguez[2], Jorge Limon[1], Diego Tlapa[1]
[1]*Autonomous University of Baja California, Mexico*
[2]*Ciudad Juárez Institute of Technology, Mexico*

This study presents the construction of a human reliability model for assembly line manual workers, using CoxÂ´s Proportional Risk model. Nine factors were identified in 120 assembly line operators using psychometric tests. Subsequently, the factors of stress, motivation, memory, and personality were identified, using a multiple linear regression analysis, as those that significantly contribute to the occurrence of human error and, together, are considered as the workers operational environment. The parameters were defined for the distribution of base failures for modeling the rate of human risk. The model obtained enables the establishment of the contribution of each factor to the probability that human errors will be committed within a determined period of time.

Influence of Online Store Belief and Product Category on Impulse Buying: An Empirical Investigation on Consumer Perceptions

Qiong Zhou[1], Xi Chen[1], Yi-Wen Chen[2]
[1]*Institute of Psychology, Chinese Academy of Sciences, University of Chinese Academy of Science, China*
[2]*Institute of Psychology, Chinese Academy of Sciences, China*

The influence of online store belief and product category on impulse buying was investigated in this study through empirical research. Path analysis technologies were applied to evaluate the research model based on the survey. The results showed that the consumer impulse buying for both hedonic and utilitarian products was influenced by the online store belief. This study will provide theoretical data base for practical application.

Exploring Effects of Ecosystem Clockspeed on Product Performance

Saku Mäkinen[1], Ozgur Dedehayir[2], Roland Ortt[3]
[1]*Tampere University of Technology, Finland*
[2]*Leiden University, Netherlands*
[3]*Delft University of Technology, Netherlands*

The performance of any technological system is dependent on the performance of its subsystems. In particular, the evolution of the entire technological systems performance is determined by the performance improvements in deficient sub-systems. In this paper, we extend earlier notions of clockspeed measurement [6, 7] in our examination of the evolutionary dynamics of technological systems. We study the time lag in reverse salience improving the overall system performance and its relation with subsequent product performance. Our empirical study of the product performance investigates the product performance of the PC (personal computer) games. Our findings suggest that the evolution of the PC technological system with respect to computer gaming function is losing forward momentum on the processing speed performance front, while maintaining momentum on the graphics performance front.

Impact of Lean Development System Implementation on the Product Development Process

Uwe Dombrowski, Kai Schmidtchen, Philipp Krenkel
Technische Universität Braunschweig, Germany

Enterprises react to changing conditions in product development with the implementation of Lean Development Systems. Lean offers a guideline for eliminating waste and increasing customer value in all processes. In particular Lean development has been introduced to improve efficiency, effectiveness and the skills of staff and organization within product development. Enterprises like Toyota, which develop and work according to lean principles, are able to develop products in significant shorter time-to-markets with higher quality and lower costs. However, implementing Lean causes remarkable changes in product development. To identify these changes the impact of lean development principles on phases and cross functions of the product development process is examined. Based on literature research the impact is evaluated by means of a three-stage-process. Afterwards results are summarized and rated. To conclude, measures concerning future actions are outlined based on the previous rating.

Internet-of-things Disrupting Business Ecosystems: A Case in Home Automation

Saku Mäkinen
Tampere University of Technology, Finland

The paper presents a case study of Internet of Things (IoT) technology application and its disruptive nature on the business ecosystem. The disruptive nature of changes is analyzed with identification of changes incurred to the business ecosystem as IoT is introduced to the marketplace. The results of a case analysis exemplify how business ecosystems are changing due to opportunities provided by IoT.

Postural Load Balancing in Daily Personnel Planning in an Assembly Line for Trailer Production by Working Posture Analysis

Christopher Brandl, Alexander Mertens, Jennifer Bützler, Christopher M. Schlick
RWTH Aachen University, Germany

In this industrial engineering study working postures of 57 workers in an assembly of a trailer manufacturer were analyzed according to the OWAS method and its extension to head postures. For eight especially stressful work tasks 19714 body postures were analyzed. Overall the working posture analysis identified a largely acceptable postural load. A significant influence of the work task on relative frequencies of posture categories and work posture combinations assigned to the same action category was found. Differences in working postures within the same work task could be identified. Finally it is shown that the conducted work posture analysis can help to improve the stress situation of workers through postural load balancing.

An Enterprise System Virtual Factories Platform for Collaborative Business Environment

Yuqiuge Hao, Ahm Shamsuzzoha, Petri Helo
University of Vaasa, Finland

In order to make sure small and medium enterprises (SMEs) can adapt them with competitive business environment globally and fulfil business requirements of new products or services, SMEs form a Virtual Enterprise to collaborate with each other's. Different enterprises align together to overcome various critical challenges such as resources and expertise while concentrate on their own core competencies. Virtual Factories (VF) is one form of collaborative networks within the manufacturing domain, where the communication between its members are orchestrated through ICT-enabled infrastructure. In this situation, collaborative networks demand an advanced information management system with the objective to share valuable knowledge and expertise. With the purpose to fulfil all business requirements and to support collaborative activities, an Enterprise System is designed as a platform to implement virtual Factories business environment. This platform enables different factories to meet their business targets and provides a single point for all factories to access the real time manufacturing and products information. This research offers a significant methodology to improve manufacturing processes and increase the ability to share information across different networked factories.

Factors Affecting Product Quality and Reliability: A Comparison of Developed and Developing Countries

Pei-Lee Teh[1], Dotun Adebanjo[2], Pervaiz Khalid Ahmed[1]
[1]*Monash University, Malaysia*
[2]*University of Greenwich, United Kingdom*

Increasing global competition has led to the need for organisations to

continually improve their quality performance. In particular, developing countries such as China are focused on catching up with more developed countries. This study examines the relationships between improvement in three factors (health and safety conditions, worker motivation and satisfaction, work/life balance policies) in increase in product quality and reliability in developed countries. Based on a questionnaire, the study shows that improvement in health and safety conditions have a significant direct impact on increase in product quality and reliability while improvement in work/life balance do not have the same effect.

Towards Recursive Plan-Do-Check-Act Cycles for Continuous Improvement

Michael Timo Schmidt[1], Fatos Elezi[1], Iris Tommelein[2], Udo Lindemann[1]
[1]*Technische Universität München, Germany*
[2]*University of California, United States*

Continuous improvement as the cornerstone of greatly successful management approaches such as lean, Total Quality Management or Six Sigma requires a systemic perspective when being implemented in complex organizational contexts. This paper presents an additional view of continuous improvement and its implementation procedures such as PDCA based on the Viable System Model (ViSM). With its underlying cybernetic principles, the ViSM provides a theoretical basis for a recursive application of PDCA cycles throughout an organization, both in a top-down- and a bottom-up manner, which serves as a foundation for implementation support of continuous improvement in complex organizational contexts.

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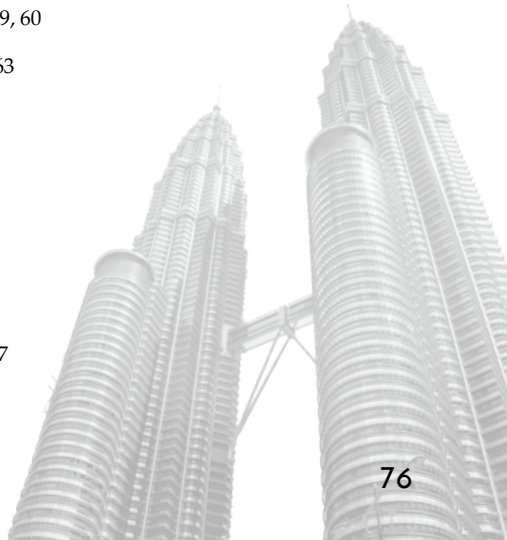

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Cheng-Hoon KHOO	Conference Manager	HP: (65) 9819 9462
Quentin PAN	Technical Program Coordinator	HP: (65) 9125 9191
Yvonne POON	Operations	HP: (65) 9125 9090

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Emergency Services

Emergency	999
Police	2262 6222
Fire Station	994
From Mobile Phone	112
Tourist Emergency Hotline (24h)	03-21496590

Taxi Services

Comfort	03-80242727
Sunlight Cab	03-90575757 / 1111
Public Cab	03-62592020
Super Cab	03-20953399

Flight Information

Kuala Lumpur International Airport (KLIA)	03-8776 2000
Subang Airport	03-7843 3000
Low Cost Carrier Terminal (LCCT)	03-8777 8888

Taxis

Taxis are readily available in KL and the fares are fairly inexpensive. All taxis have a meter so make sure that your driver is using it as this is mandatory in Malaysia. Carrying a map with you will be useful in case of possible language barriers between you and the driver.

MyTeksi app

MyTeksi is an automated smartphone based booking and dispatch platform for the taxi industry in Malaysia. MyTeksi aims to introduce simple, cost effective mobile-based technology to both the supply (dispatch companies) and demand (passenger) sides of the distribution chain. With this technology, MyTeksi hopes to optimize the matching process between taxi fleets and passengers.

MyTeksi is available on App Store, Google Play & Windows. Scan the QR code to access MyTeksi website.

Trains

- KLIA Express & KLIA Transit - Travelling from and to Kuala Lumpur International Airport is fast and convenient via the KLIA Express. This nonstop Airport Transfer travels between the Airport and the city, KL Central, in less than 30 minutes. A single trip costs RM 35. Tickets can be purchased at KLIA via the counters or vending machines, or downtown KL in the City Air Terminal (CAT) at the KL Central.
- The KLIA Transit also connects between city and the KLIA, with transits in key areas at Salak Tinggi, Putrajaya & Cyberjaya and Bandar Tasik Selatan – enroute to KLIA.
- KTM Komuter – Connects suburban towns of Rawang, Sentul, Port Klang & Seremban.
- Light Rail System (LRT) & Monorail –The Ampang Line and Kelana Jaya Line of the LRT, and the monorail provide access to major hotspots within the city. The LRT also cover some of the outskirts.

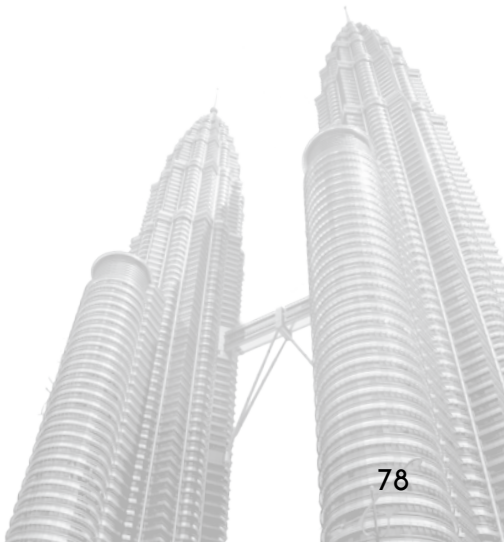
City Buses

The buses are mainly operated by Rapid KL and Metrobus, linking the city with the suburb areas in the Klang Valley. Commuting by buses is less preferred with the convenience of the rail transportation, unless you are travelling to the outlying areas such as the Batu Caves.

Touch 'n Go Card

The Touch 'n Go Card can be used as a pre-paid travel card for commuting on major public transportation. These include the RapidKL buses, LRT (Ampang Line & Kelana Jaya Line), Monorail, KTM Komuter, and the KLIA Ekspres. The card is convenient to use and save travellers' the hassle of having to queue at the cash lane to purchase tickets everytime. The card can also be used to pay for products and services at places where the Touch 'n Go sign is displayed, such as retail and food outlets, attractions, theme parks etc.

The card is available for purchase at most train stations around the city central. The minimum top-up value is RM 10. For more information, please refer to: http://www.touchngo.com.my/



10 Things to Do in Kuala Lumpur

Petronas Twin Towers

An iconic building of KL, the PETRONAS Twin Towers is the world's tallest twin structure, standing 452-metres tall and 88-storeys high. A Sky Bridge links the towers at Levels 41 and 42, 175m above street level. Be sure to visit this magnificent architecture when you visit KL! Limited tickets to enter Sky Bridge are sold daily, so do purchase the tickets in advance to avoid disappointment.

Menara KL Tower

Atop the Bukit Nanas (Pineapple Hill) Forest Reserve, Menara KL Tower is another famous landmark in Kuala Lumpur. Head up to the observation deck at 276 metres above ground to experience the most spectacular view of the metropolitan city.

Chinatown

Located in Petaling Street, Chinatown is another popular tourist spot in KL that retains much of its oriental culture and heritage. Revel in this town when the street transforms into a vibrant night market with a great variety of bargain products and delectable local delights which you will not want to miss. Explore also temples further down the Street, such as the Chan See Shu Yuen Temple and Sri Maha Mariamman Temple.

Aquaria KLCC

After visiting the Twin Towers, embark on a journey of marine life discovery at KLCC's world-class aquarium, which is only a walking distance away! Here you will find more than 5,000 different exhibits of aquatic and land-bound creatures. Interactive feeding shows are also scheduled throughout the day. For the adventurous, head to the Touchpool area where you can come into contact with live starfish and bamboo shark.

Batu Caves

The Batu Caves is one of the holiest shrines in Malaysia and a main tourist attraction of KL. A Hindu God statue sits at the entrance of the Batu Caves, beside the 272-steps which leads you to the top of the caves. Thousands of worshippers and tourists visit the Batu Caves, especially during the annual Hindu festival of Thaipusam. These caves are a definite must-visit when you are in Kuala Lumpur.

Central Market

A few minutes' walk away from Petaling Street, explore the famous landmark for Malaysian Culture, Heritage and Art & Craft - the Central Market. What used to be a wet market is now transformed into an award-winning tourist attraction and retail space. Here you can find a variety of handicrafts, souvenirs shops and also authentic Batik merchandise. While shopping, you may chance upon multi-cultural performances or celebrations at the Outdoor Stage.

Thean Hou Temple

Set on top of Robson Hill is one of the largest Chinese temples in South-East Asia – Thean Hou Temple. Many visit this Temple to worship Thean Hou Goddess, the Goddess of Mercy and the Goddess of the Waterfront. Cultural activities such as the Chinese New Year celebration and the Mid-Autumn Festival are also held here. This temple, with its spectacular skyline is also a popular spot for wedding photo-shoots. A marriage registration office is located on the 2nd level of the building.

Royal Selangor Visitor Centre

Located 20 minutes away from the KL city centre, pop by Royal Selangor Visitor Centre at Setapak Jaya and get introduced to the world of pewter craftsmanship through the complimentary guided tours in several languages. Have a go at creating your own pewter products in the workshops available at the School of Hard Knocks and The Foundry!

National Mosque

The National Mosque (Masjid Negar), is one of the largest mosques in Southeast Asia. Its unique and modern design embodies a contemporary expression of traditional Islamic art. The main dome is designed in the shape of an 18-point star which represents the 5 central Pillars of Islam and the 13 states of Malaysia, and with the "semi-opened umbrella" roof symbolising the aspirations of an independent nation.

Jalan Tunku Abdul Rahman

Enjoy a remarkable shopping and cultural experience at the shops that currently reside in the pre-war buildings along Jalan Tuanku Abdul Rahman (sometimes referred to as Jalan TAR). The shops offer a great variety of clothing materials which are fairly inexpensive. On Saturdays between 5pm to 10pm, this shopping district transforms into a night market ("Pasar Malam") with vendors selling a variety of goods and local delicacies.

Malacca

Spare a day-trip or even a weekend to visit the historic Malacca, rich with heritage buildings, landmarks and colonial structures that are still well-preserved from the early days of the Portugese and Dutch eras. Malacca is definitely a place like no other where you can experience the different cultures and mouth-watering local delicacies.

Cameron Highlands

Retreat into the popular Cameron Highlands for a relaxing weekend getaway. Over here, you can find plenty of tea plantations, flowers and vegetable farms, a lovely sight which you will probably not see elsewhere in Malaysia. Take a walk around these plantations, farms and enjoy the beauty of this place.

Genting Highlands

Head to Genting Highlands for a mountain retreat and you can find a wide array of activities available for you to choose from, such as the casino, theme parks, farms visiting and other recreational activities. Find one that suits you! Take a relaxing ride on the skyway cable-car to the top where you can have a panoramic view of the mountains and rainforest to complete your trip at Genting Highlands.

Langkawi

Be fascinated with the magical beauty of Langkawi, also known as the Jewel of Kedah, an archipelago of islands. Take a boat tour around the islands. For the more adventurous, trek through the rainfores t or go for a dive in the beautiful waters of Langkawi Islands. If you would like to head somewhere from the hustle and bustle of city for some relaxation time, Langkawi is sure to guarantee you an unforgettable experience.

Federal Territory Of Putrajaya

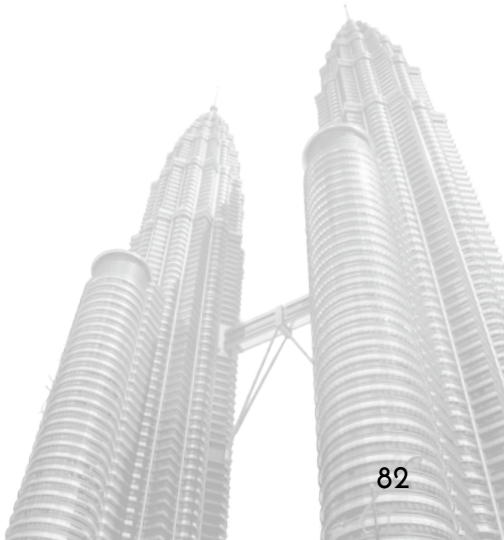
Located halfway between the Kuala Lumpur International Airport and Kuala Lumpur, Putrajaya is the administrative capital of Malaysia, a harmonious mix of nature's beauty and modern day monuments. It is Malaysia's proud symbol of dreams and aspirations come to life.

Perdana Putra Houses

Featuring Islamic-Mogul architecture, Perdana Putra houses the offices of Malaysia's Prime Minister, Deputy Prime Minister as well as the Ministers in the Prime Minister's Department.

Putra Mosque

Among the most famous landmarks in Putrajaya, this mosque is distinguished by its magnificent pink dome, majestic colonnades and beautifully landscaped water features.



Notes

CityU 30
香港城市大學
City University of Hong Kong

Department of
Systems Engineering and Engineering Management

In addition to other engineering programmes, SEEM offers a full suite of IEEM programs from **BEng** to **EngD**.

Bachelor of Engineering (Hons) in Industrial Engineering and Engineering Management

This programme aims to equip students with problem solving, technical and managerial skills and knowledge related to Industrial Engineering and Engineering Management and to prepare them for professional careers in managing manufacturing, engineering and other technology oriented services.

The graduates will develop:

* a broad understanding of the principles and technologies related to engineering and manufacturing;
* the ability to conceptualize, analyze, synthesize and implement industrial systems and services; and
* the ability to efficiently manage manufacturing, engineering and other technology oriented systems.

Master of Science in Engineering Management (MSEM)

The programme is designed for engineers with the aim to meet the education needs of practising engineering managers by developing their managerial skills, specialist expertise and functional capability in the context of Engineering Management.

The uniqueness of the programme as compared with other management programmes lies in the following:

Engineering Management Context
While the management skills are common, the engineering managers manage activities with a strong engineering / technical content. This programme provides the strong engineering management context.

Functional Needs of Engineering Management
The functions of general and engineering managers are significantly different. General managers are oriented towards business issues. Engineering managers undertake professional functions such as engineering project management, engineering operations planning and control and product / services development. This programme aims to develop a critical understanding of the academic and professional knowledge required in the execution of these engineering management functions.

Empathy
Engineers have special strengths and weaknesses. This programme focuses on the characteristics of engineers as a group. This facilitates the concentration and empathy required for the successful transition from the role of engineers to that of engineering managers.

Engineering Doctorate (EngD)

The Engineering Doctorate is a professional doctorate degree. The Engineering Doctorate program at SEEM of CityU focuses on Engineering Management. It is a part-time programme designed for senior managers and engineers in all kinds of organizations in Hong Kong and mainland China. The programme aims at developing the candidates' creative thinking and overall capability to apply innovative technologies and advanced management methods to meet the long-term strategic needs of their organizations.

The EngD programme was launched in 2000 and has attracted nearly 100 senior engineering managers and executives from engineering companies, educational institutes and governmental organizations, creating an ever-widening network for engineering management, technological innovation, entrepreneurship and industry-university collaboration.

Provide word-class education

Maximize students' potentials

Capture global opportunities

ENQUIRIES
Department of Systems Engineering and Engineering Management (SEEM)
City University of Hong Kong
Tel: (852) 3442 9321
Fax: (852) 3442 0173
Email: seemgo@cityu.edu.hk
www.cityu.edu.hk/seem/

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MEETING MATTERS INTERNATIONAL

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Meeting Matters International

1 Commonwealth Lane,#06-23 ONE COMMONWEALTH, Singapore 149544

Tel: +65 6472 3108 | **Fax:** +65 6472 3208 | **Email:** meetmatt@meetmatt.net | **Web:** www.meetmatt.net

Design : Yinmin Phyu Lwin

Editorial & Production : Alex ANG, Quentin PAN, Yvonne POON