

# 2019 International Conference on Management Science and Industrial Engineering (MSIE 2019)

**May 24-26, 2019**

**Phuket, Thailand**

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## **Welcome Message from Organizing Committee**

It is our great pleasure to invite you to join our international conferences - 2019 International Conference on Management Science and Industrial Engineering (MSIE 2019). This event will provide a unique opportunity for editors and authors to get together and share their latest research findings and results. We look forward to welcoming you at Phuket, Thailand.

We're confident that over the two days you'll get the theoretical grounding, practical knowledge, and personal contacts that will help you build long-term, profitable and sustainable communication among researchers and practitioners working in a wide variety of scientific areas with a common interest in Management Science and Industrial Engineering.

On behalf of all the conference committees, we would like to thank all the authors as well as the technical program committee members and reviewers. Their high competence, their enthusiasm, their time and expertise knowledge, enabled us to prepare the high-quality final program and helped to make the conference become a successful event.

We truly hope you'll enjoy the conference and get what you expect from the conference.

Organizing Committee

## Table of Contents

Keynote Speakers Introductions.....	4
Conference Introductions.....	9
Conference Venue .....	10
Registration Guide.....	11
Presentation Instructions .....	12
Schedule for Conference .....	13
Morning Session.....	14
<b>Opening Remarks (9:00~9:10)</b> .....	14
<b>Keynote Speech I (9:10~9:55)</b> .....	14
<b>Keynote Speech II (9:55~10:40)</b> .....	15
Coffee Break 10:40~11:00 .....	15
<b>Keynote Speech III (10:40~11:00)</b> .....	16
<b>Keynote Speech IV (11:45~12:30)</b> .....	17
Lunch 12:00~13:00 .....	17
Oral Presentation Abstracts.....	18
Session 1- Management Research .....	18
<b>ME0008</b> Presentation 1 (13:30-13:45) .....	18
<b>ME0017</b> Presentation 2 (13:45-14:00) .....	18
<b>ME0048</b> Presentation 3 (14:00-14:15) .....	18
<b>ME0049-A</b> Presentation 4 (14:15-14:30).....	19
<b>ME0066</b> Presentation 5 (14:30-14:45) .....	19
<b>ME0088-A</b> Presentation 6 (14:45-15:00).....	20
<b>ME0037</b> Presentation 7 (15:00-15:15) .....	20
<b>ME0051</b> Presentation 8 (15:15-15:30) .....	21
Session 2- Operation Resarch.....	22
<b>ME0031</b> Presentation 9 (13:30-13:45) .....	22
<b>ME0070</b> Presentation 10 (13:45-14:00) .....	23
<b>ME0073</b> Presentation 11 (14:00-14:15) .....	23
<b>ME0077-A</b> Presentation 12 (14:15-14:30) .....	23
<b>ME0050-A</b> Presentation 13 (14:30-14:45) .....	24
<b>ME0043</b> Presentation 14 (14:45-15:00) .....	24

ME0080 Presentation 15 (15:00-15:15) .....	25
ME0086 Presentation 16 (15:15-15:30) .....	25
Session 3-Supply Chain Management and Marketing (I) .....	26
ME0032 Presentation 17 (13:30-13:45) .....	26
ME0071 Presentation 18 (13:45-14:00) .....	26
ME0029 Presentation 19 (14:00-14:15) .....	27
ME0038-A Presentation 20 (14:30-14:45) .....	27
ME0040 Presentation 21 (14:45-15:00) .....	28
ME0046 Presentation 22 (15:00-15:15) .....	28
ME0074 Presentation 23 (15:15-15:30) .....	29
Coffee Break 15:30~15:50 .....	29
Session 4-Data Analysis .....	30
ME0030 Presentation 24 (15:50-16:05) .....	30
ME0061 Presentation 25 (16:05-16:20) .....	30
ME0033 Presentation 26 (16:20-16:35) .....	31
ME0047-A Presentation 27 (16:35-16:50) .....	31
ME0053 Presentation 28 (16:50-17:05) .....	32
ME0065 Presentation 29 (17:05-17:20) .....	32
ME0072 Presentation 30 (17:20-17:35) .....	32
ME0062 Presentation 31 (17:50-18:05) .....	33
ME0045 Presentation 32 (18:05-18:20) .....	33
Session 5-Manufacturing Systems.....	34
ME0015 Presentation 33 (15:50-16:05) .....	34
ME0026-A Presentation 34 (16:05-16:20) .....	34
ME0034 Presentation 35 (16:20-16:35) .....	35
ME0042 Presentation 36 (16:35-16:50) .....	35
ME0078 Presentation 37 (16:50-17:05) .....	36
ME0058 Presentation 38 (17:05-17:20) .....	36
ME0075 Presentation 39 (17:20-17:35) .....	37
ME0014 Presentation 40 (17:35-17:50) .....	37
ME0076 Presentation 41 (17:50-18:05) .....	38

<b>ME0079</b> Presentation 42 (18:05-18:20) .....	38
Session 6- Supply Chain Management and Marketing (II).....	39
<b>ME0024-A</b> Presentation 43 (15:50-16:05) .....	39
<b>ME1002</b> Presentation 44 (16:05-16:20) .....	39
<b>ME0054</b> Presentation 45 (16:20-16:35) .....	40
<b>ME0022</b> Presentation 46 (16:35-16:50) .....	40
<b>ME0057</b> Presentation 47 (16:50-17:05) .....	40
<b>ME0081</b> Presentation 48 (17:05-17:20) .....	41
<b>ME0041</b> Presentation 49 (17:20-17:35) .....	41
Dinner 18:20-19:20 .....	41
Poster session.....	42
<b>ME0003</b> Poster 1 .....	42
<b>ME0006</b> Poster 2 .....	42
<b>ME0007</b> Poster 3 .....	43
<b>ME0009</b> Poster 4 .....	43
<b>ME0011</b> Poster 5 .....	43
<b>ME0020</b> Poster 6 .....	44
<b>ME0056</b> Poster 7 .....	44
<b>ME0082</b> Poster 8 .....	45
<b>ME3001</b> Poster 9 .....	45
<b>ME3003</b> Poster 10 .....	46
<b>ME3004</b> Poster 11 .....	46
One Day Visit .....	47

# Keynote Speakers Introductions



## Keynote Speaker I

**Prof. Chen-Fu Chien**

**National Tsing Hua University, Taiwan**

Convener, Industrial Engineering and Management Program,  
Ministry of Science & Technology (MOST), Taiwan

Director, Artificial Intelligence for Intelligent Manufacturing  
Systems (AIMS) Research Center, MOST, Taiwan

Department of Industrial Engineering & Engineering Management,  
National Tsing Hua University, Hsinchu 30013, Taiwan

Dr. Chen-Fu Chien is Tsinghua Chair Professor, in the Department of Industrial Engineering & Engineering Management, National Tsing Hua University (NTHU), Taiwan. Professor Chien is the Convener for Industrial Engineering and Management Program, Ministry of Science & Technology, Taiwan. He is the Director of Artificial Intelligence for Intelligent Manufacturing Systems (AIMS) Research Center that is one of four national AI centers sponsored by MOST, Taiwan. He has been Principal Investigator for the Semiconductor Technologies Empowerment Partners (STEP) Consortium and the Director for the NTHU-TSMC Center for Manufacturing Excellence in NTHU. He received B.S. with double majors in Industrial Engineering and Electrical Engineering with the Phi Tao Phi Honor from NTHU in 1990. He received M.S. and Ph.D. of Decision Sciences and Operations Research with two minors in Statistics and Business at the University of Wisconsin-Madison, in 1994 and 1996, respectively. He was a Fulbright Scholar in the Department of Industrial Engineering and Operations Research, UC Berkeley, from 2002 to 2003. He also received the Executive Training of PCMPCL from Harvard Business School in 2007. He was a Visiting Professor in Institute for Manufacturing, Cambridge University (sponsored by Royal Society, UK), Visiting Professor in Beijing Tsinghua University (sponsored by Chinese Development Foundation), Visiting Professor in Waseda University (sponsored by Japan Interchange Association Young Scholar Fellowship).

His research mainly concerns the development of digital decision, big data analytics, and optimization methodologies and better analytical solutions for high-tech companies confronting with multi-objective decision problems involved in strategy, manufacturing, and technology that are characterized by uncertainty with massive data and a need for tradeoff among various objectives and justification for the decisions. Dr. Chien and his Decision Analysis Lab Associates have conducted many university-industry collaborative research projects with domain experts. From 2005 to 2008, he had been on-leave to serve as the Deputy Director of Industrial Engineering Division in Taiwan Semiconductor Manufacturing Company (TSMC) that is the world leading wafer foundry. Dr. Chien has 23 invention patents for intelligent manufacturing and published more than 170 journal papers. Dr. Chien has received many awards including the Executive Yuan Award for Outstanding Science & Technology Contribution (2016), the National Quality Award from the Executive Yuan (2012), Distinguished Research Awards (2007, 2011, 2016), Tier-One Principal Investigator (2005-2008), and Best Research Awards from the Ministry of Science & Technology, University Industrial Contribution Award from Ministry of Economic Affairs for Individual Contribution (2009), Distinguished University-Industry Collaborative Research Award from the Ministry of Education (2001), Distinguished

Young Faculty Research Award (2001) and Distinguished University-Industry Collaborative Research Award (2007) by NTHU, Best Paper Award (2001), Distinguished Young Industrial Engineer Award (2001), IE Medal (2010) from Chinese Institute of Industrial Engineers, Best Engineering Paper Award (2002) and Distinguished Engineering Professor (2010) by Chinese Institute of Engineers, TSMC-NTHU Faculty Semiconductor Research Grant (2004), and the Lu, Feng-Chang Award from Chinese Management Association (2007). He received the 2011 IEEE Trans. on Automation Sciences and Engineering Best Paper Award and the 2015 IEEE Trans. on Semiconductor Manufacturing Best Paper Award. Dr. Chien is a fellow of APIEMS, CIIE, and CSMOT. He is Area Editor for Flexible Services and Manufacturing Journal, Associate Editor for IEEE Transactions on Automation Science and Engineering and Journal Intelligent Manufacturing. He is on the Advisory Board of OR Spectrum and editorial board for Computers and Industrial Engineering.



## Keynote Speaker II

**Prof. Maged M. Dessouky**

**University of Southern California, USA**

**Prof. Maged M. Dessouky** is a Professor and Chair in the Daniel J. Epstein Department of Industrial and Systems Engineering. His research area is transportation system optimization where he has authored over 90 refereed publications. His paper “Optimal Slack Time for Schedule Based Transit Operations” was awarded the INFORMS Transportation Science and Logistics Best Paper Prize. He is a Fellow of IISE and serves as Associate Director of METRANS,

a center focused on solving important urban transportation problems. He is currently area/associate editor of Transportation Research Part B: Methodological, IISE Transactions, and Computers and Industrial Engineering, on the editorial board of Transportation Research Part E: Logistics and Transportation Review, and previously served as area editor of the ACM Transactions of Modeling and Computer Simulation and associate editor of IEEE Transactions on Intelligent Transportation Systems. He received his Ph.D. in Industrial Engineering from the University of California, Berkeley, and M.S. and B.S. degrees from Purdue University.



## Keynote Speaker III

**Prof. Yang Xu**  
**Peking University, China**

**Prof. Yang Xu** received his Ph.D. from Ecole Centrale de Nantes (France) in 2010. Since 2011, he has joined Peking University and became associate professor in 2013. He is visiting professor in Tsukuba University (Japan), Université Toulouse III (France), University of Buenos Aires (Argentina) and University of Edinburgh (UK). He published over 50 peer-reviewed scientific papers and many of them are published in outstanding SCI/SSCI index journals

such as Computers & Industrial Engineering, Knowledge-Based Systems, Expert Systems, International Journal of Computer Integrated Manufacturing, Knowledge Organization, CIRP Annals. He is in charge of several national-level scientific projects and participate in several international academic cooperation. His research interests include industrial engineering, knowledge management and information systems, especially in mass customization modeling, optimization and applications.



## **Keynote Speaker IV**

**Prof. Parames Chutima**  
**Chulalongkorn University, Thailand**

**Prof. Parames Chutima** received his Bachelor of Engineering in Electrical Engineering from Chulalongkorn University, two Master degrees from Chulalongkorn University and Asian Institute of Technology, respectively, and a PhD degree in Manufacturing Engineering and Operations Management from the University of Nottingham, UK. Currently, he is a full Professor of Industrial Engineering, Faculty of Engineering, Chulalongkorn University, Thailand. In addition, he is also the Director of the Regional Centre for Manufacturing Systems Engineering, Chulalongkorn University. His research interests include multi-objective optimisation in operations management, production planning and control of assembly lines, just-in-time production systems and simulation modelling. He is the author of several international publications in conference proceedings and refereed journals.

## Conference Introductions

Welcome to 2019 MSIE Phuket conference. This conference is organized by ACM Chapter Singapore. The objective of the conference is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in Management Science and Industrial Engineering.

**Papers will be published in the following proceeding:**

International Conference Proceedings Series by ACM (ISBN: 978-1-4503-6264-1), which will be archived in the ACM Digital Library, and indexed by Ei Compendex, Scopus and submitted to be reviewed by Thomson Reuters Conference Proceedings Citation Index (ISI Web of Science).

**Conference website and email:** <http://www.msie.org/> and [msie@acm-sg.org](mailto:msie@acm-sg.org)

# Conference Venue

## Phuket Orchid Resort and Spa

Add: 34, Luangphochuan Rd, Tambon Karon, Muang District, Phuket 83100 Thailand

<http://www.phuketorchid.com>

Tel. 076 358 317, 091 037 0448



Phuket Orchid Resort & Spa, set beside the Andaman Sea, on Karon Beach, the 524-room resort includes family rooms with pool views, and has an easy-going village atmosphere with tropical gardens and tall palm trees. There is a pool with the highest water slide in Karon to provide a thrilling water ride for everyone, accompanied by the slide's happy purple penguin mascot, Guinluder. The kids' club has plenty of action to keep the youngsters happy, the grown-ups will love the sublime Kanda Spa, and there are plenty of activities in the resort and on the beach to provide the perfect family holiday and put a smile on the faces of everyone.

# Registration Guide

**May 24, 2019 (Friday)**

**Time: 11:00~17:00**

**Venue: Lobby of Hotel Phuket Orchid Resort and Spa**

## Registration Steps

1. Arrive at the Lobby of Hotel Phuket Orchid Resort and Spa;
2. Inform the conference staff of your paper ID;
3. Sign your name on the participants list;
4. Sign your name on Lunch & Dinner requirement list;
5. Check your conference kits: (1 conference program, 1 lunch coupon, 1 dinner coupon, 1 receipt, 1 name card, 1 flash disk, 1 laptop bag);
6. Finish registration.

**Tips: Please arrive at the conference to upload or copy Slides (PPT) into the laptop room 10 minutes before the session begins.**

### Note:

- (1) The organizer doesn't provide accommodation, and we suggest you make an early reservation.
- (2) One Best Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session on May 25, 2019.
- (3) One day tour includes lunch but does not include attractions tickets, and participants need to take care of themselves.

# Presentation Instructions

## Instructions for Oral Presentations

### Devices Provided by the Conference Organizer:

Laptop Computer (MS Windows Operating System with MS PowerPoint and Adobe Acrobat Reader)  
Digital Projectors and Screen  
Laser Sticks

### Materials Provided by the Presenters:

PowerPoint or PDF Files (Files should be copied to the Conference laptop at the beginning of each Session.)

### Duration of each Presentation (Tentatively):

Regular Oral Presentation: about 12 Minutes of Presentation and 3 Minutes of Question and Answer

## Instructions for Poster Presentation

### Materials Provided by the Conference Organizer:

The place to put poster

### Materials Provided by the Presenters:

Home-made Posters  
Maximum poster size is A1  
Load Capacity: Holds up to 0.5 kg

## Best Presentation Award

One Best Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session on May 25, 2019.

## Dress code

Please wear formal clothes or national representative of clothing.

# Schedule for Conference

Hotel Lobby, May 24 (10:00-17:00)		
<b>Arrival and Registration</b>		
Orchid Convention Hall, May 25 (9:00-12:30)		
<b>Opening Remark (9:00-9:10)</b> Prof. Parames Chutima, Chulalongkorn University, Thailand		
<b>Keynote Speech I (9:10-9:55)</b> <b>Title: Industry 3.5" to Empower Intelligent Manufacturing for Emerging Countries and Empirical Studies in Taiwan</b> Prof. Chen-Fu Chien, National Tsing Hua University, Taiwan		
<b>Keynote Speech II (9:55-10:40)</b> <b>Title: Cost-Sharing Transportation Systems</b> Prof. Maged M. Dessouky, University of Southern California, USA		
<b>Coffee Break &amp; Group Photo (10:40-11:00)</b>		
<b>Keynote Speech III (11:00-11:45)</b> <b>Title: Decision Support Systems for mass customization</b> Prof. Yang XU, Peking University, China		
<b>Keynote Speech IV (11:45-12:30)</b> <b>Title: Research Trends on an Assembly Line Balancing Problem</b> Prof. Parames Chutima, Chulalongkorn University, Thailand		
<b>Lunch (12:30-15:30) Restaurant</b>		
Orchid Convention Hall, May 25, 2019 (15:30-18:20)		
<b>Session 1 (13:30-15:30)</b> <b>Management Research</b> Chair: Prof. Chen-Fu Chien	<b>Session 2 (13:30-15:30)</b> <b>Operation Resarch</b> Chair: Prof. Hasan Huseyin Turan	<b>Session 3 (13:30-15:30)</b> <b>Supply Chain Management and Marketing (I)</b> Chair: Prof. Maged M. Dessouky
<b>Coffee Break (15:30-15:50)</b>		
<b>Session 4 (15:50-18:20)</b> <b>Data Analysis</b> Chair: Prof. Yang XU	<b>Session 5 (15:50-18:20)</b> <b>Manufacturing Systems</b> Chair: Prof. Parames Chutima	<b>Session 6 (15:50-17:35)</b> <b>Supply Chain Management and Marketing (II)</b> Chair: Assoc. Prof. Peter Karacsony
<b>Dinner (18:20-19:20)</b>		
Orchid Convention Hall, May 25 (10:40-15:50)		
<b>Poster Session</b>		
May 26 (9:00-17:00)		
<b>One-Day Tour</b>		

# Morning Session

**Morning, May 25, 2019 (Saturday)**

**Time: 9:20~12:00**

**Venue: Orchid Convention Hall, Hotel Phuket Orchid Resort and Spa**

**Opening Remarks (9:00~9:10)**

Addressed by Prof. Parames Chutima from Chulalongkorn University in Thailand

**Keynote Speech I (9:10~9:55)**

**Title: Industry 3.5” to Empower Intelligent Manufacturing for Emerging Countries and Empirical Studies in Taiwan**

**Chair Prof. Chen-Fu Chien**

**National Tsing Hua University, Taiwan**

*Abstract*—The leading industrialized countries with advanced economies including Germany and USA have reemphasized the importance of advanced manufacturing in the corresponding national competitive strategies such as Industry 4.0 and AMP. The paradigms of intelligent manufacturing, automation system, and global manufacturing networks are shifting, in which the increasing adoption of the multimode sensors, intelligent equipment and robotics, Internet of Things (IOT), big data analytics, and artificial intelligence have empowered an unprecedented level of manufacturing intelligence. Indeed, leading international companies are battling for dominant positions in this newly created arena via providing novel value-proposition solutions and/or employing new technologies to construct “manufacturing platform” to attract and recruit partners and user companies. On the other hand, most of industry structures in emerging countries may not be ready for the migration of advanced cyber-physical manufacturing systems as proposed in Industry 4.0, while also facing other needs to enhance research and practice for industrial engineering and management. This study aims to propose a novel strategy called “Industry 3.5” as a hybrid strategy between the best practice of existing manufacturing for Industry 3.0 and to-be Industry 4.0. Indeed, the developments of new technologies such as AI, Big Data Analytics also provide opportunities for disruptive innovations to support smart production. A number of empirical studies in high-tech manufacturing and other industries are used for validation that we have enabled intelligent manufacturing under existing Industry 3.0 to address some of the needs for flexible decisions and smart production in Industry 4.0. Future research directions are discussed to implement the proposed Industry 3.5 to bridge value propositions of industrial engineering research in the restructuring value chains of global manufacturing networks.

**Keywords:** Industry 3.5; Smart Production; Flexible Decision; Big Data; Manufacturing Intelligence.

**Keynote Speech II (9:55~10:40)****Title: Cost-Sharing Transportation Systems****Prof. Maged M. Dessouky****University of Southern California, USA**

*Abstract*—A set of nascent industries focusing on cost-sharing transportation systems such as ridesharing/carsharing have recently emerged. These types of cost-sharing transportation systems are also being introduced in freight delivery through horizontal cooperation of their logistic systems to reduce costs and delay times. Horizontal cooperation achieved through pooling of freight transportation networks reduces total shipping costs, and alleviates the impact on traffic congestion. One major impediment for successful implementation of these types of transportation systems is the determination of the cost-share amount for each participant. The cost-sharing problem has largely been neglected in the literature and is the focus of this talk. One crucial component of a cost sharing transportation system is the allocation of costs and/or savings to each participant in the system. Without a model to allocate costs and/or savings to each participant in the system, there is no basis to allocate the costs in a fair manner to the participants, thus making it less of an incentive to participate. In this talk we give two examples of models, one for ridesharing and the other for freight consolidation, for determining the cost-share of each participant.

**Coffee Break & Group Photo Taking 10:40~11:00**

**Keynote Speech III (10:40~11:00)****Title: Decision Support Systems for mass customization****Prof. Yang XU****Peking University, China**

*Abstract*—Mass customization (MC) is one of the leading strategies used in industrial engineering nowadays. It aims at balancing production costs and customers' individual satisfaction. With the rapid improvement of human's production level and information processing ability, simply considering the mode of mass production and/or personalized customization cannot meet people's requirements. It is well known that economy of scale and economy of scope is a pair of conflicts, and how to get the balance is the key issue to promote enterprises' competition. Mass customization refers to the capability to provide customized product/service for a mass market. Mass customization makes high added-value products/services, and enhances profitability by reducing the costs of production and logistics and better satisfying the customer personalized requirements. By analyzing customer preference, product features and cost, decision support systems for mass customization are built to obtain the optimized solution.

**Keynote Speech IV (11:45~12:30)****Title: Research Trends on an Assembly Line Balancing Problem****Prof. Parames Chutima****Industrial Engineering, Chulalongkorn University, Bangkok, Thailand**

*Abstract*—An assembly line comprises a set of sequential ordered workstations, connected with a material handling equipment, where parts are assembled together to form a finished good. An assembly line balancing problem (ALBP) involves the assignment of tasks to workstations without violating the precedence relationships among the tasks and the cycle time constraint in order to optimise some performance measure. The first real assembly line was appeared in 1908 invented by Henry Ford to produce Ford Model T (namely Tin Lizzie) – the car that anyone can afford. Around 50 years later, in 1955, the first published article of the ALBP was issued by Salveson. Since then, the topic of the ALBP has received great interest from both academic world and practitioners. Apparently, the ALBP still maintains its momentum as evidenced by the number of research articles published during the last two decades.

The recent research on the ALBP is addressed in this presentation. To facilitate the focus of the review, a proper classification of the literature is needed. The most well-known classification scheme for the ALBP was proposed by Baybars (1986), i.e. simple assembly line balancing problem (SALBP) and general assembly line balancing problem (GALBP). However, such classification scheme seems inappropriate with today's research progress because the research on the SALBP is in the maturity stage, but more and more effort has been paid to extend the GALBP to reflect real industry problems. This introduces a great non-homogeneity within the voluminous publications of the GALBP.

To make the literature review more effective and be able to articulate the review to reflect the cutting edge of the research in each group appropriately, we propose to broadly differentiate them according to their layout configurations, i.e. layout-based literature survey on the ALBP. Also, the emphasis of this presentation is on the papers published during 2014-2018. As a result, various types of basic assembly line layouts and their hybrids are presented. Within each particular layout, the following sub-classifications are addressed, i.e. the chronological organisation of papers, types of problems, optimised objectives, solution techniques, product characteristics, task characteristics, task time characteristics, operator characteristics, simultaneous decision making, and real case study. The relevant statistics are presented to demonstrate the development and gap in the ALBP in recent years. As interest continues, some future research trends are discussed.

**Lunch 12:00~13:00**

# Oral Presentation Abstracts

## Session 1- Management Research

**Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.**

**Afternoon, May 25, 2019 (Saturday)**

**Time: 13:30-15:30**

**Venue: Orchid Convention Hall (Part A), Hotel Phuket Orchid Resort and Spa**

**Session Chair: Chen-Fu Chien**

### **ME0008** Presentation 1 (13:30-13:45)

Positioning appropriate knowledge in knowledge-based systems

**Zhao Liu**<sup>1</sup> and Yixin Chen<sup>2</sup>

1. People's Public Security University of China, China; 2. Peking University, China

*Abstract*—Knowledge management is a crucial means to gain competitive advance and one of its main aims is how to realize the best use of the knowledge asset. This paper aims at the research on how to position the appropriate knowledge according to a given context, for better knowledge asset utilization.

### **ME0017** Presentation 2 (13:45-14:00)

Regional Administrative Measures Promote Safe Development of Chemical Industrial Parks in Shandong Province of China

**Jian Sun**, Tao Chen and Hongyong Yuan

Tsinghua University, China

*Abstract*—This paper describes background and main points of a regional administrative measure that aims to mitigate integrated risks of chemical industrial park. In the fourth quarter of 2017, administrative measures for authorization of chemical industrial parks in Shandong province were issued officially. Administrative measures presented twelve compulsive requirements and quantitative optimal conditions of five categories, named planning layout, public infrastructure, work safety, environmental protection and economic development. Chemical industrial parks satisfied with all compulsive requirements and get over 60 scores on optimal conditions could apply for authorization. Contributions of administrative measures for development of chemical industrial parks are analyzed. Since implementation of administrative measures, the number of chemical industrial parks decreased from 199 to 85 in Shandong province. More importantly, inherent safety, environmental standard and comprehensive competitiveness of local chemical industrial parks have significant improvements.

### **ME0048** Presentation 3 (14:00-14:15)

The Correlation Analysis between Logistics Performance and Financial Performance of Thai Industry

**Suphawadi Chakkham** and Korrakot Yaibuathet Tippayawong  
Chiang Mai University, Thailand

*Abstract*—The main purpose of this paper is to analysis correlation and explore the logistics scorecard factors that are influencing the implementation of financial performance in the Thai industry. The data collected from the logistics scorecard appraisal forms of 254 sectors in Thailand. Factor Analysis (Principal component analysis: PCA) Technique was applied to the construct validity of factors to extract factors of logistics scorecard indicators from all 23 items. The factor scores of the generated elements were analyzed by using correlation techniques and regression analysis with dependent variables as selected financial ratios. The results of the paper demonstrated that three organizational factors were Organizational Management and development factor, Service and Responsiveness factor and Information Management factor. Also, the Information Management factor influenced Receivable Turnover Ratio, Assets to Equity ratio and Debt to Equity ratio at a significant level.

**ME0049-A** Presentation 4 (14:15-14:30)

Process management and innovation management in the automotive industry

**Marek Roszak**, Piotr Sakiewicz and Rafał Kania  
Silesian University of Technology, Poland

*Abstract*—The subject of the study is a presentation of the view on the analysis of issues related to the issue of process management and innovation management in enterprises in the automotive industry. The aim of the publication is to indicate the relationship between concepts related to process management and innovation management as a factor determining the effectiveness and efficiency of business management. Process management is one of the basic concepts of a modern approach to managing organizations, it also constitutes an essential requirement for enterprises in the automotive industry related to implemented certified management systems, both resulting from the ISO 9001 and IATF 16949 standards. Process management concept as one of the overarching criteria for its implementation recognizes the quality of both products and processes. Innovation management is one of the primary criteria that have a significant impact on shaping the business processes of each organization. Innovation management is an action aimed at implementing changes developing the growth of modernity and competitiveness of the organization, including the operation of the entire supply chain - which is of particular importance in the automotive industry - and added value created in it. The analysis of the issue concerning practical aspects of the connection of both process management and innovation aims to determine how both these concepts complement each other in production practice in order to increase efficiency in change management regarding both products and processes carried out in enterprises, including a direct impact on the increase of competitiveness of production processes.

**ME0066** Presentation 5 (14:30-14:45)

Examining the relationship between workplace stress and organizational commitment

**Peter Karacsony**

Széchenyi István University, Hungary

*Abstract*—Nowadays, labor markets are fighting with labor shortages, leading to a growing challenge for organizations to retain their staff. Leaders have to face many job challenges, such as workplace stress. Workplace stress is a result of the interaction between a person and their work environment. Increasingly common workplace stress could be a cause for concern, as it may have a significant economic impact on the organization. Long-term work stress can cause the workers to lose their commitment to the organization. The purpose of this study is to assess the relationship between workplace stress and employee commitment through the example of Hungarian small and medium-sized enterprises. As a research method, I chose a questionnaire survey which included both open and closed-type issues. While evaluating the questionnaires, I found that there is a strong correlation between workplace stress and employee commitment. Moreover, in addition to occupational stress having a negative effect on organizational commitment, it also has a negative effect on work performance. My research shows that the managers of the examined organizations largely know of workplace stress, and have the professional knowledge to handle the problems.

**ME0088-A Presentation 6 (14:45-15:00)**

Managing Disruption Risk in a Supply Chain Under Price Uncertainty by Renegotiation

**Shouting Zhao** and Juliang Zhang

Beijing Jiaotong University, China

*Abstract*—We examine the efficacy of renegotiation on mitigating disruption risk caused by price uncertainty in a supply chain in this paper. For agricultural products, energy products, metals etc., market prices are often uncertain. The uncertainty might even make a retailer disrupted. The disruption brings some difficulties to the supply chain. We construct a two-period supply chain model to solve the problem. We first analyze the cases with and without disruption. Then we consider renegotiation in the supply chain. By comparing the results in different cases, we obtain that the retailer disruption always hurts the manufacturer's profit despite that the disruption happens to the retailer directly. Disruption is also detrimental to the whole supply chain. Nevertheless, the negative effects of disruption to the manufacturer and the supply chain can be alleviated by renegotiation. Besides, we also find two counterintuitive results: (a) disruption may be beneficial to the retailer; (b) renegotiation may harm to the retailer although the retailer gets helps when it encounters disruption under renegotiation. We then propose a coordinated renegotiation, which requires the retailer to share some benefit of high market price. We show that such a renegotiation could achieve the profits in the supply chain without retailer disruption.

**ME0037 Presentation 7 (15:00-15:15)**

Simulation-based Analysis of Military Workforce Planning Strategies

**Hasan Huseyin Turan**, Sondoss Elawah and Michael Ryan

University of New South Wales Canberra, Australia

*Abstract*—The success of any organization, either commercial or government, depends heavily on the execution of effective workforce planning. An effective workforce plan should achieve simultaneously both organizational and employee objectives by recruiting, promoting and deploying the right employees in the right places at the right times. In this study, we particularly focus on a military workforce planning problem, which brings additional challenges due to its closed (i.e., experienced workforce is generated within the

system rather than recruited from outside) and strictly hierarchical (i.e., career advancements happen step-by-step, along the pyramidal rank chain) structure. To support workforce planning, we develop a decision-support system based on a system dynamics (SD) simulation model with the specific objective of evaluating different workforce planning strategies. As opposed to the existing military workforce models which assume steady state conditions, the proposed approach also considers the interactions among the demand-side (e.g., operational requirements and schedules) of the system and the supply-side (e.g., recruitment and promotion strategies). We demonstrate the approach through a case study to gain insight into how the different parameters affect the overall system with regards to output metrics such as the operational readiness of a fleet.

**ME0051 Presentation 8 (15:15-15:30)**

Product Selection Strategy Analysis of Crowdsourcing Platform from the Full Cost Perspective

**RuiXue Li<sup>1</sup>**, Can Peng<sup>1</sup> and Huiliang Sun<sup>2</sup>

1. Nanjing University of Aeronautics and Astronautics, China; 2. Shandong University of Finance and Economics, China

From the perspective of full cost, this paper uses Coase's transaction cost theory to analyze the causes of crowdsourcing, and on this basis to analyze the applicability of crowdsourcing platform products. At the same time, based on the crowdsourcing platform--zsj.com, we use the big data technology to grasp and analyze the related data of the crowdsourcing platform's successful cases in the past five months, and use the relevant statistical analysis method to categorize and analyze the industry attributes of the top five orders of the success cases of the zsj.com, in order to verify the theory mentioned in the article.

## Session 2- Operation Resarch

**Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.**

**Afternoon, May 25, 2019 (Saturday)**

**Time: 13:30-15:30**

**Venue: Orchid Convention Hall (Part B), Hotel Phuket Orchid Resort and Spa**

**Session Chair: Prof. Hasan Huseyin Turan**

**ME0031** Presentation 9 (13:30-13:45)

Debiasing Strategy to Improve Inventory Decision in the Newsvendor Problem (an Experimental Study)

**Elok Pitaloka**<sup>1,2</sup>, Nur Aini Masrurh<sup>1</sup> and Shi-Woei Lin<sup>2</sup>

1. Universitas Gadjah Mada, Indonesia; 2. National Taiwan University of Science and Technology, Taiwan

*Abstract*—One of the foundational models for the study of inventory management is the newsvendor problem. Since the newsvendor problem involving perishable goods, one application that might be very concerning nowadays is food inventory management. Particularly, the food and culinary industries face the problem associated with the setting: supply–demand mismatch which causes business performance reduction due to profit loss. Thus, the developing of mathematical models in the newsvendor problem could be the solution to the problem since it can provide a good insight to determine optimal order quantities.

However, inventory managers' order decision might deviate from the assumption in newsvendor setting which claims that individuals would make a rational decision that can maximize their utility and profit as well. Schweitzer & Cachon [1] is one of the earliest works that provides evidence of this deviation and concludes that there is a mismatch between newsvendor theory and experimental observations which causes non-optimal decisions due to the decision biases that occur in the newsvendor context. Thereafter, a growing number of studies in newsvendor problem have started to move toward experimental studies. However, most of the existing studies only involve students as the subject, leaving an important question of how the result of such studies can be implemented in the real world where the manager really works.

In this study, we conduct an experiment to investigate the inventory managers' order decision in newsvendor settings in small fast-food restaurants in Yogyakarta, Indonesia. Afterward, we conduct the same experiment with students to provide a structured comparison between manager and student on decision making in the newsvendor problem. After obtaining the order decision pattern, which is not optimal due to anchoring and insufficient adjustment bias that occur, this study will also come up with a debiasing strategy in the form of Decision Support System (DSS). The DSS we propose aims to provide an alternative order for the inventory manager so that the overall inventory performance can be improved. To prove the effectiveness of the DSS we propose, we will also conduct an experimental work to compare the result of the order decisions with and without DSS provided.

**ME0070 Presentation 10 (13:45-14:00)**

The Blend of Credit Scoring Model for Individual in the Dmaic Process for Reducing Non-Performing Loan Risk

**Vongseriprathna Thavarith** and Jirapan Liangrokapart

Mahidol univeristy, Thailand

*Abstract*—Non-performing loan (NPL) is the main threat for all financial institutions. In order to improve loan approval process and reduce the risk of NPL, this research proposes an application of six sigma and credit scoring model. Six Sigma is an outstanding tool for process improvement by reducing defects in the process in manufacturing and service industries. Credit scoring model is a statistical model that aid in the decision making for the bank and other financial institution whether they should approve or reject the loan application. Six Sigma offers value by reducing defects and Credit scoring model can enhance credit lending policy. The implementation of Six sigma and Credit scoring model in bank loan approval process is a new topic and few literatures have studied in this area. The objectives of this research are to identify factors causing NPL and propose framework using Six Sigma and Credit scoring model to improve bank loan process and enhance the credit lending policy to reduce the risk of NPL. Case study of a bank in Cambodia is illustrated.

**ME0073 Presentation 11 (14:00-14:15)**

Development of a Deep Learning-LSTM Trend Prediction Model of Stock Prices

**Edwin Torralba**

Institute of Information and Computing Sciences, University of Santo Tomas, Philippines

*Abstract*—Stocks prices follow the Brownian motion process that moves in a random and erratic state making it impossible to determine the future price based on the historical performance of the stock. However, the availability of the historical data of stock prices can't be ignored as it might hold hidden patterns that manifest the behavior of investors as well as the market sentiments and political condition. Thus, investors have adapted deep learning models of regression and neural network analysis to process the stock's historical data along with the traditional fundamental analysis in forecasting the trend of stock prices. Deep learning changed the landscape of formulating informed decisions on how investors can minimize their risks in investing on stocks. As an investor, one should understand that deep learning models are dependent on the different hyper-parameters such as epochs, number of nodes in hidden layers, and number of hidden layers in order to produce the best trend prediction model. Unfortunately, the available literature and empirical studies are limited when it comes to the identification and selection of deep learning's hyper-parameters. This study attempts to explore the appropriate number of hidden layers that can be used to develop a deep learning model for trend prediction model in stock trading.

**ME0077-A Presentation 12 (14:15-14:30)**

An Improved Golden Ball Algorithm for the Motorcycle Routing of Food Delivery Service in Thailand

**Tantikorn Pichpibul**

Panyapiwat Institute of Management, Thailand

*Abstract*—This research presents a problem motivated by a real case study of a restaurant which provides the delivery of Thai barbecue (BBQ) food including pork, chicken, other meats, and vegetables from restaurant to customers located around Nonthaburi Province, Thailand. Moreover, the customers also

receive an electronic BBQ pan in order to cook themselves, and send it back to restaurant within next day. This case study was identified as vehicle routing problem with backhauls that a motorcycle delivers products from restaurant to customers in linehaul, and collects the electronic BBQ pan from customers to restaurant in backhaul. Currently, the delivery planning is ineffectively done by using only personal experience. Therefore, an improved golden ball algorithm, which is an effective meta-heuristic algorithm recently used to solve this kind of problems, is proposed and compared to the real decisions of the planner who has motivated the problem. The results show that the proposed algorithm is competitive and outperforms the planner decisions in all directions. Moreover, the total delivery distances are also decreased by 33.61%. This can be affected by cost reduction for the restaurant significantly.

#### **ME0050-A Presentation 13 (14:30-14:45)**

Analyzing of the value stream mapping - a process case study

**Mariola Dźwigoł-Barosz, Piotr Barosz, Marta Dudek-Burlikowska and Marek Roszak**

Silesian University of Technology, Poland

*Abstract*—The article refers to the method of value stream mapping on the example of the manufacturing process, indicating its importance, as the method which contributes to the improvement of the process functioning in a significant way.

The results of the process effectiveness analyses were presented which were obtained as a result of the application of the value stream mapping method. The analysis covered all the stages of an exemplary production process. The OEE, overall equipment effectiveness ratio, was subject to detailed analysis. The analyses of the process improvement were based on PDCA approach.

The result of the analyses carried out refers to the determination and implementation of new solutions for the analyzed production process in order to obtain the improvement of OEE ratio within the area of the selected production operations which make up the bottleneck for the analyzed process.

The importance and use of the value stream mapping methodology in the construction of beneficial relationships with the final Customer were indicated.

The experiments and analyses were carried out based on the real production process what contributes to the indication of justifiability for carrying out analyses based on value stream mapping and using OEE ratio in the production processes and indicates for the justifiability of their implementation.

#### **ME0043 Presentation 14 (14:45-15:00)**

Spare Parts Demand Forecasting in Energy Industry: A Stacked Generalization-Based Approach

**Yu-Chung Tsao<sup>1</sup>, Nani Kurniati<sup>2</sup>, I Nyoman Pujawan<sup>2</sup> and Alvin Muhammad 'Ainul Yaqin<sup>1</sup>**

1.National Taiwan University of Science and Technology, Taiwan;2. Institut Teknologi Sepuluh Nopember, Indonesia

*Abstract*—This paper deals with spare parts demand forecasting problem in energy industry. Forecasting spare parts demand has its own challenges because in general spare parts demand is characterized by high variation in its demand size and in its inter-demand interval. In this paper, a forecasting approach to deal with spare parts demand is proposed. The proposed approach utilized stacked generalization technique to combine traditional time series forecasting method and machine learning method into a single ensemble. To test its performance, a case study in a natural gas liquefaction company is provided in this paper. In the case study, the proposed approach is utilized to forecast the monthly demand of spare parts used for maintenance operations. To compare its performance, several traditional time series forecasting methods

(including Moving Average, Single Exponential Smoothing, Croston's method, Syntetos-Boylan Approximation, and Teunter-Syntetos-Babai) and several machine learning methods (including Linear Regression, Elastic Net, Neural Network, Support Vector Machine, and Random Forests) are also used in the case study. As results, the proposed approach performed better than other methods in terms of forecast error minimization.

**ME0080 Presentation 15 (15:00-15:15)**

A numerical tool for assessing disaster related injuries and personal protective clothing

**Jian Wang**, Xin Zheng, Ming Fu, Wenguo Weng, Yun Zheng and Chang Xu,  
Tsinghua University, China

*Abstract*—Emergency rescues often face a single or composite disaster environments, such as high temperature, fire smoke, dangerous chemical accidents, explosive, cutting, cryogenic freezing. To research the mechanism of human body injury and the principle of individual protection in the disaster environments, the mathematical models of the human body injury and individual protection are developed to study the injury mechanism of skin, trunk and respiratory system and the principle of individual protection. An integrated analysis software is developed to simulate the injury process of typical disaster environments to human skin, trunk and respiratory system, and guide the development of protective materials and equipment. The software system can quickly estimate the risk degree of various disaster environments. It can evaluate personnel safety and protective performance of individual protective equipment, and provide guides for emergency rescue and disposal.

**ME0086 Presentation 16 (15:15-15:30)**

Boiler Explosion In Bangladesh: Causes, Consequences and Precautions

**Md. Zakir Hossan**<sup>1</sup>, Sayeed Islam<sup>2</sup>, Md. Ferdous Khan<sup>3</sup>, Sayma Shammi<sup>4</sup> and M Ashraful Amin<sup>1</sup>,  
1.Independent University, Bangladesh; 2. Manarat International University, Bangladesh; 3. Sonargaon University, Bangladesh; 4. North South University, Bangladesh

*Abstract*—Bangladesh is a developing country as recognized by the United Nations. The development of industries is one of the main rationales behind this huge achievement. But the safety measures and precautionary systems for industrial hazard management is nowhere to be improved in Bangladesh. Boiler explosion has been a major setback and has lashed the industry for years due to various reasons including ignorance of officials, lack of awareness and sometimes even due to lack of proper facilities. As a matter of fact, the accountability in this sector is thin and has been worsening as time elapses. This paper looks into the cases and analyzes the reason behind the incidents that have taken place in the history of boiler explosion. After much scrutiny, this paper deciphers the ignored parameters that have led to such menaces and thus points out measures to help create awareness and prevent the cases of boiler explosion and loss of lives and property.

## Session 3-Supply Chain Management and Marketing (I)

**Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.**

**Afternoon, May 25, 2019 (Saturday)**

**Time: 13:30-15:30**

**Venue: Orchid Convention Hall (Part C), Hotel Phuket Orchid Resort and Spa**

**Session Chair: Prof. Maged M. Dessouky**

### **ME0032 Presentation 17 (13:30-13:45)**

Sustainability in Supply Chain Management across the Private Sector of UAE

**Liaqat Ali<sup>1</sup>** and **Ayesha Farooq<sup>2</sup>**

1. Ajman University, United Arab Emirates; 2. Universiti Malaysia Sabah, United Arab Emirates

*Abstract*—The sustainability in Supply Chain Management (SCM) of the private sector is important to be considered as this sector is not owned or operated by the government. The aim of this research is to forecast the future of supply chain management within the private companies in the United Arab Emirates (UAE). The research study was conducted in five different private companies including; property management, retail stores, beverages, banking sector and construction firm. This qualitative study was conducted to highlight several approaches that are adopted by the organizations when dealing with internal and external hurdles and openers to achieve sustainable supply chain management in private sectors.

Then the data from semi structured interviews is used to draw the organizational structure approach to the Supply chain management. The research therefore met its results either get the support or limitations lay inside or outside an organization and developing a structure to categorize organizations approaches to achieve the sustainability of supply chain management.

### **ME0071 Presentation 18 (13:45-14:00)**

The effect of knowledge management and decision making levels of supply chain

**Sawangwong Anurak** and **Chaopaisarn Poti**,

Chiang Mai University, Thailand

This research is to evaluate the effect of knowledge management (KM) on decision-making levels of supply chain (DMSC) in relations to organizational performance (OP). This research has gathered questionnaire survey from 255 Thai manufacturing firms. Structural equation modeling (SEM) was utilized to create a causal model to assess the relationships in between KM, DMSC and OP. The result has shown that KM strongly correlates with both DMSC and OP.

**ME0029 Presentation 19 (14:00-14:15)**

Patient Food delivery error in the hospital : A case study in Thailand

**Suebsakul Tonjang** and Natcha Thawesaengskulthai

Department of Industrial Engineering, Faculty of Engineering, Chulalongkorn University, Bangkok

*Abstract*—Food service provided in hospitals has considerable significance, as it is part of the medical treatment. In a sample hospital, food delivery error occupied 37.4% which was the highest complaint among all problems in 2017. This problem has never been investigated for its root causes and there has been no measures established against it. Therefore, the purpose of this research is to investigate for the causes of the discrepancies in the food service provided for the inpatients.

Root causes of the inpatient food delivery error are identified by triangulation of quantitative data by survey & complaint analysis and qualitative data by focus group. The first set consists of questionnaire responded by nutrition unit staff, experts in food service and hospital directors, in total of 71 respondents. The questionnaire was modelled after the four types of medication errors[1], [2]. The second set was the review of the food service error from inpatient complaint files recorded during May-December 2017. The third set was focus group interview among 71 hospital staff. The service blueprint was used in search of the pain points.

The three methods showed consensus results. Both survey and complaint results revealed that the error were caused by 1) transcribing (61.3%, 54.3%) 2) administration error (25.8%, 32.6%) 3) dispensing error (10.1%, 10.9%) 4) prescription error (2.7%, 2.2%). Furthermore, the survey of the relation between the means of importance and the actual performance in each process revealed that transcribing error and administration error were the root causes at 95% confidence level. In addition, focus group interview with the 71 hospital staff confirms the finding. Transcribing error included miscommunication and data transference across the departments. Administration error arises during the delivery process. Dispensing error occurred in the food preparation and food trays, for example, wrong delivery. Lastly, prescription error was caused by the doctors who were in charge of ordering the patient's dietary requirements. Next, the authors conducted in-depth case study analysis by using service blueprint with 217 food delivery case studies. We found that the root cause was the operation of data transference across the departments. Results from this paper urge the need for process innovation in assuring quality of patient food delivery.

**ME0038-A Presentation 20 (14:30-14:45)**

A bibliometric analysis of supply chain analytical techniques published in Computers &amp; Industrial Engineering

**Yasser Dessouky**<sup>1</sup>, Christian A. Cancino<sup>2</sup>, Keivan Amirbagheri<sup>3</sup>, José M. Merigó<sup>2,4</sup>

1. San Jose State University, United States; 2. University of Chile, Chile; 3. University of Barcelona, Spain; 4. University of Technology Sydney, Australia;

*Abstract*—Computers & Industrial Engineering (CIE) is a leading international journal that publishes manuscripts in the field of supply chain. Because of the recent explosion of different analytical techniques to address supply chain related problems, the aim of this work is to study CIE publications with a focus on supply chain and by using a bibliometric approach that can identify the leading trends in this area by analysing the most significant papers, keywords, authors, institutions and countries. The work also develops a graphical mapping of the bibliographic material by using the visualization of similarities (VOS) viewer software. With this software, the study analyses bibliographic coupling, co-occurrence of author keywords and how the journal is connected with other journals through co-citation analysis. The results indicate that

Computers and Industrial Engineering has the fourth highest publications in this area among leading journals that publish in Supply Chain, and China and Iran are the leading publishing countries while Taiwan and Singapore have the highest publications per capita.

**ME0040 Presentation 21 (14:45-15:00)**

Hybrid Optimization Approach for Supply Chain Planning

**Jirasak Ji** and Navee Chiadamrong

Sirindhorn International Institute of Technology, Thailand

*Abstract*—The goal of supply chain planning is designing an optimal and feasible production and distribution plan for the whole supply chain. Two common methods of optimization are analytical and simulation-based optimization. In this paper, both methods are combined to consolidate the strengths of each, also known as the hybrid analytical and simulation approach. A case study of a multi-period, multi-echelon, and multi-product production and distribution problem that maximizes the whole supply chain's profit is introduced, to demonstrate the effectiveness of the proposed hybrid approach. The analytical model is solved to find the ideal optimal production-distribution plan, and then the plan is inputted into a simulation model, where uncertainties are included. The proposed approach then identifies a feasible plan that meets makespan and service level requirements. Safety stock is incorporated to fulfill the service level requirements and maximize the supply chain's profit. This procedure continues iteratively until the production-distribution plan is feasible and optimized. The results show that the proposed approach can solve for an optimal and feasible solution with relatively fast computational time.

**ME0046 Presentation 22 (15:00-15:15)**

A Supply Chain Network Design Under Advance-Cash-Credit Payment Scheme

**Aisyah Dewi Muthiah**<sup>1,2</sup>, Yu-Chung Tsao<sup>1</sup> and Niniet Indah Arvitrida<sup>2</sup>

1. National Taiwan University of Science and Technology, Taiwan; 2. Institut Teknologi Sepuluh Nopember, Indonesia

*Abstract*—The increase of e-commerce activities affects many aspects of supply chain decisions, including payment term alternatives. There are many variations of payment terms used in e-commerce practices. The vendor may offer the retailer a combination of several payment terms. It may consist of an advance-cash-credit (ACC) payment scheme, which means that the buyer needs to pay a fraction of the purchasing cost before he receives the item (advance payment). The other payment alternatives are enabling the buyer whether to pay some cash when the item is arrived (cash on delivery), and/or to pay the remaining purchasing cost after a credit period (credit payment). This paper investigates the effect of payment schemes on the supply chain network design. The network consists of an outside supplier, multiple DC's, and multiple retailers. The distribution centers receive an upstream ACC payment from the supplier. The problem is to determine the optimum location, allocation, as well as the inventory cycle time with the objective function of minimize total cost. A continuous approximation is used in the model development, and the concept of time value of money concept is considered. The numerical example is used to demonstrate the solution approach. This paper provides modeling approach that supply chain network designer can use as a reference.

**ME0074 Presentation 23 (15:15-15:30)**

How swift guanxi influences product evaluation and repurchase intention: An analysis of C2C buyer's perceptions in Taiwan

**Wen-Kuei Wu** and Yi-Hui Jiang

Chaoyang University of Technology, Taiwan

*Abstract*—Our study aims to investigate the effects of the buyer-seller swift guanxi facets in the buyer's product evaluation, which in turn facilitate the repurchase intention in online social commerce context. This study conducts a questionnaire survey and utilizes Partial Least Square (PLS) path model to examine how the buyer's product evaluation moderate the link between buyer-seller swift guanxi and repurchase intention. The result reveals that the positive effects of buyer-seller swift guanxi facets on buyer's perceived product quality and value except the effect of reciprocal favors. Furthermore, the reciprocal favors tends to decrease buyer's perception of product quality and repurchase intention. Besides, the buyer's product evaluation plays a mediating role between swift guanxi and repurchase intention in online social commerce context. All measures were self-reported by participants and more response should be collected. In the future, comparing the dyadic perspectives to explore theoretical, practical implications is also needed. Moreover, researcher should incorporate more contingent variables to examine the effect of swift guanxi.



**Coffee Break 15:30~15:50**

## Session 4-Data Analysis

**Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.**

**Afternoon, May 25, 2019 (Saturday)**

**Time: 15:50-18:20**

**Venue: Orchid Convention Hall (Part A), Hotel Phuket Orchid Resort and Spa**

**Session Chair: Prof. Yang XU**

**ME0030** Presentation 24 (15:50-16:05)

Constructing Norm Curves for the Functional Movement Capacity of Sub-healthy Adults via SMARC—a Case Study in Taiwan

**Hornng-Chyi Horng<sup>1</sup>**, Yi-Ting Chen<sup>1</sup> and Hui-Hsuan Liu<sup>2</sup>

1. Chaoyang University of Technology, Taiwan; 2. Preventive Medical Health Care Co., Ltd, Taiwan

*Abstract*—In this paper, we constructed norm curves for the functional movement capacity of sub-healthy adults, for both woman and man in Taiwan, via SMARC. SMARC, abbreviations for synchronized monitoring analysis recording care, is a software system associated with eight equipment developed by PMHC Co., Ltd. (Preventive Medical Health Care Co., Ltd.). Healthy people can perform certain functional movement patterns so that injuries to the body in daily life can be minimized. Sub-healthy people, suffering from shoulder neck syndrome, lower back pain, metabolic syndrome, et al., can improve their functional movement capacity and relief various syndrome via SMARC series products. However, after the assessment by SMARC, people need to be encouraged by knowing how they performed relatively to people with the same gender among similar age group. Like physical age displayed on weighing scale, this information encourages people to pay more attention to their physical fitness and increases their willingness in participating subsequent training program. In this study, we constructed five norm curves, for woman and man respectively, on overall score, upper body functional capacity, core functional capacity, lower body functional capacity, and whole body coordination and agility. A total of 337 adults are evaluated, in which 175 working on university campus while others working elsewhere. Ages range from 17 to 72, and approximately 35% are male. In general, the weakest part is the core functional capacity, the same for both woman and man.

**ME0061** Presentation 25 (16:05-16:20)

Numerical investigation of fluid structure interaction of 1.5MW wind turbine rotor blade system

**Rajendra Roul**, Awadhesh Kumar and Sukesh Chandra Mohanty

National Institute of Technology Rourkela, India

*Abstract*—In this paper, the Fluid-Structure Interaction (FSI) is performed to get the aerodynamic and structural reactions of a 1.5MW 3D wind turbine blade by utilizing the commercialized ANSYS. The aerodynamic analysis is carried out using both modified Blade Element Momentum Method (BEM) and Computational Fluid Dynamics (CFD), whereas, structural modeling is done using Finite Element Method (FEM). However, for FSI, CFD method is employed to develop pressure loading which later on passed as pressure loads to ANSYS static structural module to determine stresses and deformations on the blade. The

complete analysis follows the interface of CFD and FEA through one way coupling.. Five operational conditions are evaluated. The calculation of total deformation and von-misses stress have been done by considering various material and geometrical parameters and are found to be within material and structural limits as per the requisite design standards.

**ME0033 Presentation 26 (16:20-16:35)**

Real Time Electronic Design Automation (EDA) Scheduling System in IC Design Industry

**Jia-Nian Zheng**<sup>1</sup>, Chen-Fu Chien<sup>2</sup> and Tzu-Yu Lin<sup>2</sup>

1. Asia University, Taiwan; 2. National Tsing Hua University (NTHU), Taiwan

*Abstract*—With the global competition and short life cycle in semiconductor industry, the IC design companies try to keep their competitiveness. Besides the human resources and advanced technology, enhancing the speed of the development is an important method to enhance market share. IC designers usually use electronic design automation tool to shorten the development. However, the EDA tools and resources are expensive and limited. Hence, it becomes a critical problem to allocate the resources and schedule the jobs. This study aimed to develop an IC design job scheduling decision support system framework. The framework enhances the throughput and reduces the idle. This study implements the proposed framework in practice. The empirical study conducted in IC design company to validate the developed solution and model implementation.

**ME0047-A Presentation 27 (16:35-16:50)**

A study of monocular near-to-eye display position for a navigation task

**Bereket Haile Woldegiorgis**, Chiuhsiang Joe Lin and Aisyah Iadha Nuraini

National Taiwan University of Science and Technology, Taiwan

*Abstract*—The computing industry is promoting wearable computers with near-eye-displays (NEDs) for various applications. So far, commercially available glasses have been designed with different source locations of the images; at the top, middle, and bottom of one of the eyes. However, there was no consistent guideline to determine the comfortable location of the displays. It is not also known whether the different applications and nature of tasks would influence the position of the NEDs. In this study, the effects of display positions and the number of turns in navigation tasks on visual fatigue of NED users were evaluated. Nine participants performed the navigation tasks in four levels of display positions (three on monocular NED and one on the screen projector display) and three levels of numbers of turns (low, medium, and high). The tasks were randomized 2D mazes. The critical fusion frequency (CFF), blink rates, eye movement velocities, saccades rates and duration, and subjective ratings were recorded to compare the visual fatigue induced by the tasks. The results showed that the blink rate, saccades rate, and eye movement velocity were sensitive to the positions of the displays; however, CFF, mean of saccades duration, and subjective ratings were not. However, the number of turns in the navigation tasks and the interactions between the positions of navigation displays and number of turns did not show any significance on any of the visual fatigue parameters. It can be concluded that for shorter duration navigation tasks on monocular NEDs in front of the right eye, the top-right position might induce less fatigue than the position below the eyes. The results are of great significance in monocular displays especially used for short-duration navigation tasks that demand high eye movements.

**ME0053 Presentation 28 (16:50-17:05)**

Indoor Environment Quality Indicators in Co-Op Supermarkets in Kuwait

**Azel Almutairi**

Kuwait University, Kuwait

*Abstract*—In this paper, the indoor quality indicators were investigated in a Co-Operative (Co-Op) supermarket in Kuwait by both subjective and objective evaluations. A questionnaire with Likert scale basis was conducted to reflect the customers and workers health environment satisfaction. Measurements were carried out to examine the parameters that determine the air and acoustic pollution inside the Co-Op supermarket. The perceived air quality (PAQ) was calculated, and indoor air quality index (IAQ) was investigated. Three pollutants, carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), and formaldehyde (HCHO) were studied. The CO<sub>2</sub> concentration was notably high.

**ME0065 Presentation 29 (17:05-17:20)**

Exploring variations from medical records for chronic disease

**Praowpan Tansitpong<sup>1</sup>, Wanpracha Chaovalitwongse<sup>2</sup> and Apirak Hoonlor<sup>3</sup>**

1. NIDA Business School, Thailand; 2. University of Arkansas, US; 3. Mahidol University, Thailand

*Abstract*—Health policy reform in major developing countries has changed the way patients are treated for chronic disease due to high cost and government regulations. In order to understand the overall patterns of the treatments, this study showcases a method to collect electronic medical records (EMRs) of prescription and treatment cost by health coverage programs from local data source. Focusing on admitted patients with conditions related to diabetes and hypertension, the results suggested a high variation of treatment in patients with hypertension, but very limited variation among diabetes patients. The results also suggested prescriptions and treatment cost among health benefit programs.

**ME0072 Presentation 30 (17:20-17:35)**

A Comparative Study of Object Recognition Techniques: Softmax, Linear and Quadratic Discriminant Analysis Based on Convolutional Neural Network Feature Extraction

**Napol Siripibal, Chaitawatch Sudprasert and Siriporn Supratid**

Rangsit University, Thailand

*Abstract*—This paper presents a comparison study on using softmax, linear discriminant analysis (LDA) and quadratic discriminant analysis (QDA) for object recognition. The least effort is needed for hyper-parameter tuning or selection for all such three classifiers. Convolutional neural network (CNN), using feed-forward-architecture deep learning neural network is employed here for efficient feature extraction and reduction. Then, the extracted, reduced features are fed into the classification comparison. The experiments rely on a small-image CIFAR-10 dataset such that a simple, four convolutional-layer CNN architecture can possibly handle effective feature extraction with hardly over-fitting. Recognition performance evaluations rely on averages of precision, recall, F1 scores and accuracy rates, based on 10-fold cross validation for bias reduction purpose. Such performance measures are implemented under balanced as well as unbalanced – class data, respectively referred to equal and uniform-random-sampling unequal –size class dataset. The results indicate a few bits of recognition performance differences regarding F1 scores as well as accuracy rates among the CNN-LDA, CNN-QDA and CNN-softmax, where the balanced-class and unbalanced-class are separately determined. However, the lowest and the highest of the largest wrong prediction cases are

generated by CNN-QDA and CNN-softmax respectively for both balanced and unbalanced-class data.

**ME0062 Presentation 31 (17:50-18:05)**

Analysis of Curvature Effect on C-Shaped Buildings

**Monalisa Mallick**, Awadhesh Kumar and Kanhu Charan Patra

National Institute of Technology Rourkela, India

*Abstract*—The distribution of wind-induced pressure coefficient on the surfaces of the C-shaped building with the varying angles of incidence and with and without round corner has been studied. For this, experiments have been carried out on a typical C-shaped building plan in a sub-sonic open circuit wind tunnel. Two different configurations of C-shaped models i.e., with outer curved and without outer curved C-shaped models were tested. The experimental findings were showed over an extended range of angles of incidence ( $0^\circ$  to  $180^\circ$ ) at an interval of  $30^\circ$ . Using Digital Sensor Array (DSA), the pressure coefficient data were recorded at the pressure tapping provided in a grid pattern throughout the surfaces. This procedure was repeated with all the surfaces undertaken, angle of incidence and building plan configuration. The surfaces data of pressure coefficient enabled the determination of mean pressure coefficient at the selected tapping locations. The surface pressure was found to vary significantly with the location on a particular surface and surfaces as well as with the angle of incidence. Pressure coefficient was influenced by building configuration, the extent of curved corners, wind angle of incidence, wind flow behavior and surroundings on buildings. It has been observed that the curvature is effective in reducing pressure coefficient corresponding to no curvature. The experimental results thus obtained were supported by Numerical analysis. To achieve this, numerical investigation was carried out by using ANSYS FLUENT software. The analysis was carried out using Computational Fluid Dynamic (CFD) with k-e viscosity model and the results obtained were compared with the corresponding experimental data. Experimental and numerical study is carried out for comparison purposes and results have good agreement.

**ME0045 Presentation 32 (18:05-18:20)**

Inflation and Bank Profitability: G20 Countries Banks Panel Data Analysis

**Huseyin Cetin**

Bursa Technical University, Turkey

*Abstract*—In that research, by using panel data analysis the relationship between G20 countries banks' profitabilities and G20 countries' inflation rates was found for the period of 2013-2015. Fixed effect was used in the model. When panel data analysis was done for G20 countries, inflation was found to have negative impact on banks' profitability. When micro analysis was done on panel data, it was observed that inflation has negative fixed effect on return on assets of developed countries banks and it was observed that inflation has positive fixed effect on return on assets of developing countries banks.

## Session 5-Manufacturing Systems

**Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.**

**Afternoon, May 25, 2019 (Saturday)**

**Time: 15:50-18:20**

**Venue: Orchid Convention Hall (Part B), Hotel Phuket Orchid Resort and Spa**

**Session Chair: Prof. Parames Chutima**

**ME0015** Presentation 33 (15:50-16:05)

Machinability Appraisalment of Inconel 825 during Electro-Discharge Machining: Use of Transformer Oil as Dielectric Media

**Anshuman Kumar Sahu**, Santosh Kumar Sahu, Saurav Datta and Siba Sankar Mahapatra

National Institute of Technology Rourkela, India; VSSUT, Burla, India

In the present work suitability of transformer oil to be used as dielectric media during Electro-Discharge Machining (EDM) of Inconel 825 is studied in comparison with conventionally used dielectrics i.e. EDM oil. Machining performance is evaluated in purview of material removal efficiency. Morphology and topographical features of the machined surface produced by using transformer oil (as dielectrics) are studied. Surface topographic studies include surface roughness, material migration, phase analysis as well as immigration of foreign elements. It is observed that as compared to EDM oil, transformer oil offers higher material removal rate and superior surface finish. It is also observed that increase in peak current causes increased material removal rate, surface roughness, surface crack density and white layer thickness.

**ME0026-A** Presentation 34 (16:05-16:20)

Using simulation model to evaluate the optimal manpower planning problem of food mixer assembly plant

**Hung-Kai Wang**, Sheng-Hong Hsu, Qing-Fu Yang and Wei-Yuan Chen

Feng Chia University, Taiwan

*Abstract*—The food mixer assembly plant is a highly labor intensive factory. All stations in the factory need manpower to assemble products. Nowadays, the operators need to shuttle between the various stations to support each other, and the manpower distribution of different products is also different, which causes the factory often facing uneven manpower distribution for the front and back sections of the production line. This situation not only greatly increases the inventory, but also leads to an increase in the production cycle time of the product and delays the delivery to customers. This study constructs a simulation model by the Flexsim software to evaluate the optimal manpower planning problem in a leading food mixer assembly plant in Taiwan. Firstly, the Flexsim simulation software helps the production manager determine the optimal number of operators with respect to different product mix by the cost-benefit analysis. Secondly, the production manager can effectively distribute the responsible works for each operator by the Flexsim 3D visual interface. Finally, when facing future capacity extension, the simulation model helps precisely assess the production capacity of new machines and new production lines. The case company can ensure continued profitability when facing future market uncertainty.

**ME0034 Presentation 35 (16:20-16:35)**

Subjective Evaluation of Glovebox Gloves on Hand Tactility and Discomfort

**Peng-Cheng Sung** and Yuan-Shyi Peter Chiu

Chaoyang University of Technology, Taiwan

*Abstract*—This study evaluated the subjective effects of glovebox gloves on hand tactility and discomfort. Three commercially available glovebox gloves, namely butyl, hypalon, and neoprene in 0.015" and 0.03" thickness, were selected for evaluation. The subjects first performed the tip pinch exertions with 11 Newton force repeatedly (12 times/minute) for 15 minutes with bare hand or gloved hands. Then, the subjects were asked right at the end of the tip pinch task to give a numeric score of discomfort using the Borg CR-10 scale. In addition, a disk-criminator was used to perform the static two-point discrimination test (2PD test) on the volar pad of subject's dominant index finger right after the completion of the tip pinch task. The results indicate that all gloved hands increase the discomfort scores significantly than that of bare hand. The results also show that 0.03" neoprene and hypalon gloves decreased the tactile performance significantly compared to that of bare hand. To maintain tactility and reduce discomfort during glovebox gloves usage, the results of this study indicate that butyl material could be selected since it could offer better performance for these subjective effects. In addition, thinner gloves could also be used to retain better tactility and comfort performances.

**ME0042 Presentation 36 (16:35-16:50)**

Plant Layout Design for Improvement and Egg Grading Process

**Banjarat Yimsri**, Anucha Watanapa and Wisitsree Wiyaratn

Department of Production Technology Education, King Mongkut's University of Technology Thonburi, Thailand

*Abstract*—The egg sizes separation factory original working area is a single story building with limited space. This leads to not adequate production area due to continuous production rate every day. Therefore, the factory is facing the problem of full production capacity as well as too small storage which is not enough for product inventory. As a result, a countermeasure for this issue is urgently needed. The company was intended to build a new production factory for expanding the production capacity in order to meet the needs of customers which have increased. The data was collected in order to understand the production process and the process flow, working time and the analysis was based on the Systematic Layout Planning (SLP) principle (by analyzing the relationships of each department process). The analysis results of the workflow process can be enhanced in 3 models, the first model has a total distance of 91.82 meters, the second model has a total distance of 86.05 meters and the third model has a total distance of 61.36 meters, the conclusion is that the best model is the third one with the shortest total distance of 61.36. And the analysis results of the most worthwhile area used in each department can be explained that the first model has a total area of 1,097.4 square meters, the second model has a total area of 1,353.1 square meters and the third model had a total area of 1,451.4 square meters. It was concluded that the best model was the third one with the highest total area of 1,451.4 square meters, based on the comparison of the current factory layout and the new factory layout, the result is that the total distance in the new plant layout is less than the total distance in the plant layout by 33.98 meters, or 22%. Due to the reduction in transportation distance, the filtered egg size can be increased to increase the efficiency of the process.

**ME0078 Presentation 37 (16:50-17:05)**

An Ergonomic Design of Wheelchair Bed Transfer for Post Stroke Patients

**Ma. Janice Gumasing**, Almarose C. Villapando and Kareen C. Pernia

Mapua University, Philippines

This paper aims to redesign the existing hospital bed in the Philippines by developing a wheelchair bed for bed transfer of patients with Cerebro Vascular Disease. According to National Statistics Office (NSO), Cerebro Vascular Disease, popularly known as “stroke” ranked fourth in the top ten causes of death in the Philippines (PSA, 2016). Because of this, the researchers come up with the study of developing an assistive device for both patients and nurses who handle and facilitate this type of patients. The study focuses only on post-stroke patients who are in recovery and rehabilitation stage which are called “post-stroke patients”. The disability of post-stroke patients causes them to be dependent on their nurses or caregivers. According to studies, nurses and caregivers are exposed to risk of musculoskeletal disorders due to manual lifting and handling of patients especially during bed transfer. Data shows that 78% of nurses and caregivers experience pain and discomfort in their back and upper extremities due to manual lifting and poor working posture when handling patients. For these reason, it became the interest of the researchers to redesign a wheelchair bed for bed transfer of post stroke patients in order to reduce the risk of nurses and caregivers to develop musculoskeletal disorders. Principles of ergonomics are used to come up with the dimensions of the proposed product based on the anthropometric measurements of the target users. Value analysis and Quality Function Deployment (QFD) tool are also used to identify the technicalities of the product based from the users’ requirements. Using all these tools, the researchers came up with the proposed product design of the wheelchair bed. The proposed design includes elevating bed frame into the medically required angles of elevation while the patient is at bed in three different positions. It has also a collapsible and extending bed rail, foot board with foot plate that serves as the foot rest of the patient with slimmer and more comfortable mattress material. In the ergonomic design of wheelchair bed, factors such as safety, convenience and comfortability of users were considered. The researchers have conducted review of related literature, direct observation, surveys, actual measurements and statistical analyses in order to describe factually and accurately the proposed design of wheelchair beds.

**ME0058 Presentation 38 (17:05-17:20)**

Application of Value Engineering (VE) Technique to Reduce Cost in Case of Forklift’s Tire Replacement

**Noppadol Sriputtha**<sup>1</sup> and Boonsin Nadondu<sup>2</sup>

1.Thai-Nichi Institute of Technology, Thailand; 2. Nissan Trading (Thailand) Co., Ltd, Thailand

*Abstract*—This research aims to study the cost reduction of tire replacement in a case of forklifts by using VA/VE technique. A comparison of replacement cost between use of retreading tires and new OEM tires under the same conditions at 1,000 working hours was studied. The results shown that the replacement cost by using retreading tires are 288,560 THB which is lower than using the new OEM tire about 53.25%.

**ME0075 Presentation 39 (17:20-17:35)**

An Application of Production Scheduling Problems with Sequence-Dependent Setup Time in a Glass Bottle Forming Process

**Chansiri Singhtaun** and Thanaphat Nutchaphan

Kasetsart University, Thailand

*Abstract*—In this research, a parallel identical machine scheduling problem with sequence-dependent setup time is applied in a glass container manufacturing plant. The production scheduling program is developed to provide the optimal production schedule for 82 products with 9 identical individual section machines in a forming process with a minimum makespan objective. The machine setup time depends on the sequence of products produced. By using Visual Basic for Applications in Excel, a mathematical model is developed from input data and imported data from a database. The problem is solved by branch and cut algorithm using OpenSolver and Premium Solver. The answers from the program are translated and illustrated in terms of tables and Gantt charts that report the production sequence and total makespan. The results show that OpenSolver has the capability to solve the problem of 20 products and 4 machines, which is the maximum problem size of the case study company when using a present production plan within 3.65 hours. A new production plan or schedule for 82 products with 9 machines using Premium Solver is also proposed. The new production schedules give 4.79% lower makespan within 74.25 minutes.

**ME0014 Presentation 40 (17:35-17:50)**

Surface Topographical Characteristics of Electro-Discharge Machined Ti-5Al-2.5Sn: Effects of Peak Current

**Thrinadh Jadam**, Saurav Datta and Manoj Masanta

National Institute of Technology, Rourkela-769008, Odisha, India

*Abstract*—In the present work, topographical study of machined Ti-5Al-2.5Sn surface is carried out in the context of Electro-Discharge Machining (EDM). EDM experiments are conducted by varying peak discharge current. Machining performance is evaluated in purview of surface topography which includes study of crater dimension, surface roughness, surface crack density, white layer thickness, material migration, phase alteration and micro-indentation hardness. Results indicated that EDM produces disappointing surface morphology of the machined specimen. Increase in peak currents results in formation of rough surface with severe surface cracks and deposition of thick white layer. Significant transfer of carbon and copper elements is detected through EDS analysis of the machined surface. Pyrolysis of dielectric media and electrode wear promote immigration of such carbon and copper element transfer, respectively. Carbon migration at the machined surface causes precipitation of titanium carbides traced through XRD analysis. Formation of such carbides contributes to higher micro-hardness value up to certain depth beneath the machined surface. Below this hardened layer, microhardness values follow gradual truncation as distance is increased towards bulk of the parent material.

**ME0076 Presentation 41 (17:50-18:05)**

An Efficient Algorithm Applied to Capacitated Vehicle Routing Problem with Consideration of Time Windows by Using Ranking-Based Concept and Dynamic Programming

**Cheng Heng Uy**, Thana Sarttra, Supphachan Rajsiri and Nattanee Charoenlarpkul

Mahidol university, faculty of engineering, department of industrial engineering, Thailand

*Abstract*—Capacitated Vehicle Routing Problem and Time-Windows (CVRPTW) is one of the most well-known variations of VRP, which is a combinatorial optimization and classified as NP-hard problem. A considerable number of solving techniques have been proposed not only exact and heuristic, but also metaheuristic methods. Although the optimal solution can be guaranteed applying the exact algorithms, computational time is the most concern when the problem size is increased. Heuristic methods normally provide solutions with a very fast speed but most of them are local optima. Metaheuristic methods are also other approaches to solve this problem providing much larger search space. However, most of them are on the basis of experiments requiring an extensive number of parameter settings. In this research, a novel efficient approach to solve CVRPTW is proposed using the several concepts of graph traversal with breadth-first search and rank-based algorithm during the initial route construction, and Dynamic programming is then used for solution improvement with regard to capacity constraints and time windows. The performance of the proposed method compared to the state-of-the-art algorithms will be very competent in terms of both solution quality and computational time with no effort on parameter settings as a major advantage.

**ME0079 Presentation 42 (18:05-18:20)**

An Ergonomic Design of Breastfeeding Chair for Filipino Mothers

**Ma. Janice Gumasing**, Almarose C. Villapando and Catherine D. Siggaoat,

Mapua University, Philippines

This paper aims to design and develop an ergonomic breastfeeding chair that will be more comfortable and suitable for breastfeeding mothers by promoting an improved posture during breastfeeding and would decrease the risk of mothers for musculoskeletal disorders. According to the report from National Health Interview Survey (NHIS, 2010), breastfeeding mothers experience pain in neck, lower back, face and jaw due to prolonged sitting and awkward posture during breastfeeding. Mothers unconsciously slouch into positions that stress their joints, ligaments and muscles. They are also exposed to lifting force due to carrying of infants during breastfeeding. This posture aggravates painful muscle spasms and could lead to injury. Given these conditions, the researchers intend to design a breastfeeding chair for Filipino mothers using ergonomic intervention. Principles of anthropometry are used to come up with the dimensions of the proposed design based on the anthropometric measurements of the target users. Value analysis and Quality Function Deployment (QFD) tool are also used to identify the technicalities of the product based from the users' requirements. The proposed breastfeeding chair consists of a headrest, backrest, armrest with pulling arc handle, seat cushion and a 2-position locking foot stool. This ergonomic breastfeeding chair will not only provide comfort to the mothers but will also provide safe environment to the infants. The researchers have conducted review of related literature, direct observation, surveys, actual measurements and statistical analyses in order to describe factually and accurately the proposed design of breastfeeding chair.

## Session 6- Supply Chain Management and Marketing (II)

**Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.**

**Afternoon, May 25, 2019 (Saturday)**

**Time: 15:50-17:45**

**Venue: Orchid Convention Hall (Part C), Hotel Phuket Orchid Resort and Spa**

**Session Chair: Assoc. Prof. Peter Karacsony**

### **ME0024-A Presentation 43 (15:50-16:05)**

Spatial analysis in geomarketing systems

**George Grekousis**

Sun Yat-sen University, School of Geography and Planning, China

*Abstract*—This study presents the use of Geographic Information Systems (GIS) and spatial analysis techniques (spatial clustering) in geomarketing systems. Geomarketing systems analyse demographical and purchasing related data, to understand consumer behaviours, assisting thus in enhanced business management through the adoption of more targeted marketing campaigns. This work describes how these tools can be applied for a) data-analysis (clustering techniques, data mining), b) geographical analysis through GIS, providing all necessary tools for analysing and mapping data and implement space in marketing, c) statistical analysis for prediction and modeling, and d) decision-analysis for strategic planning. The work also focuses on the integration of artificial intelligence (i.e. Kohonen Self Organizing Maps, fuzzy c-means), and machine learning methods, in geomarketing tools to better handle big data. A case study for European consumers based on lifestyle and socioeconomic data is also presented, to highlight how the use of these systems assist in business and service planning, logistics, and management.

### **ME1002 Presentation 44 (16:05-16:20)**

Research on the Path of Sustainable Development of Born International Firms

**Yating Hou** and Gang Fang

Beijing Institute of Fashion Technology, China

*Abstract*— With the emergence of born global firms different from traditional enterprises, the international operation began at the beginning of the establishment, which is very different from the traditional development route of the enterprise. The traditional theory of step-by-step international operation cannot explain this phenomenon. Therefore, this paper adopts a combination of theoretical analysis and case analysis. Based on the theory of born global firms, this paper studies a born global firm in Ningbo. It analyzes the basic situation of the enterprise and the process of transformation and upgrading, and puts forward suggestions for its future international development, and provides practical countermeasures for the sustainable development of China's born global firms.

**ME0054** Presentation 45 (16:20-16:35)

Impact of JIT Production on Organizational Performance in the Apparel Industry in Bangladesh

**Abul Bashar**<sup>1</sup> and Ahsan Hasin<sup>2</sup>

1. Independent University, Bangladesh; 2. Bangladesh University of Engineering &amp; Technology, Bangladesh;

*Abstract*—Apparel manufacturers in Bangladesh are under constant pressure to improve their manufacturing performance in the current impulsive and intensive competitive business environment. The manufacturers are attempting to implement new and advanced manufacturing techniques to make their manufacturing process more productive. However, implementing advanced and innovative manufacturing techniques such as lean manufacturing or Just-in-Time production in the developing country like Bangladesh is still challenging due to several critical barriers. The purpose of this paper is to investigate the implementation status of Just-in-Time, identify the relationship of JIT practice with the non-financial (operational) and financial (business) performance of the organization. Empirical data have been collected from 227 apparel factories using non-probability convenient sampling method. SPSS 20.0 and AMOS software were used for data analysis. The findings of this study provide evidence that JIT implementation has significant direct impact on organizational performance.

**ME0022** Presentation 46 (16:35-16:50)

Supply Chain Quality Coordination Strategies for Complex Product under the Manufacturer Being at a Disadvantage

**Huan Wang**<sup>1</sup>, Zhigeng Fang<sup>1</sup> and Benhai Guo<sup>2</sup>

1. Nanjing University of Aeronautics and Astronautics, China; 2. China Jiliang University, China

*Abstract*—Complex product manufacturing industry showing is showing a strong momentum, more and more manufacturers are flooding into the market, trying to gain a place in the fierce market competition by developing new products. In the early stage of complex product development, some manufacturers are at a disadvantage in supply chain quality coordination management due to the influence of technology, market and industry status. This study firstly analyze four dilemmas disadvantaged manufacturers may be in. On this basis, strategy suggestions to reverse the disadvantaged situation are proposed for manufacturer from the following four aspects: (1) Optimize the distribution of benefits. (2) Unify quality standards and establish supply chain quality control system. (3) Set up supply chain quality control platform and resolve quality conflict. (4) Construct supply chain quality culture.

**ME0057** Presentation 47 (16:50-17:05)

Sales and operations planning (S&amp;OP) performance under highly diversified mass production systems

**Yahya Ghrab** and Mustapha Sali

PSL University , France

*Abstract*—Sales and operations planning (S&OP) is a midterm planning practice that is widely used in industries with relatively volatile demand and limited capacities to align demand and supply. Several research studies, as well as practical guides, have been developed to examine the design and implementation of S&OP processes. Most of these studies are general and have no reference to the industry behind them. However, regarding planning, each industry has its properties. Taking a “one size fits all” approach is not profitable for extreme cases, such as for an automotive industry known for the very large product portfolios. Our contribution intends to examine this issue in detail by performing a literature review

on the effectiveness of S&OP and its impacts on supply chain performance. We try to reveal why actual S&OP practices are not fit for highly diversified mass production systems, and we deduce that there is a need to redefine the S&OP process for such industries.

**ME0081 Presentation 48 (17:05-17:20)**

An Application of the Supply Chain Operations Reference Model for the Flight Simulator Maintenance Service Process Model: A Case of Asian Aviation Training Centre

**Suchapit Krueakam** and Vithaya Suharitdamrong

KMITL, Thailand

*Abstract*—Flight training simulator is simulated real flying by using motion and visual systems. The use of the flight simulators is widely accepted around the world due to the growing of an aviation industry. To avoid failures and improve mechanic and effective of the system, it is necessary to implement the maintenance processes. Moreover, a flight simulator operator needs to ensure that the performance of the flight simulator training devices (FSTDs) is qualified with the international regulations published by EASA, ICAO, and FAA. SCOR model is extensively used in manufacturing sectors. However, the SCOR model has many limitations such as semantics and process types when applied to the services sectors because the structure of the SCOR model is shaped to the structure of Supply Chain Management (SCM) established for manufacturing and was described as inapplicable in the services section. Additionally, it has been found that there are no many researches have focused on the specific class of services which related to the SCOR model. The objective of this paper is to present an implementation of a flight simulator maintenance process modelling through a supply chain operation reference (SCOR) model with the intention to improve services through maintenance management, like Supply Chain Management. The study is justifying that the SCOR model can be developed within the maintenance management which is services supply chain management. Finally, the maintenance process modelling was purposed with the most popular notation is the Business Process Model and Notation (BPMN2.0) to support the identification and visualisation of the processes.

**ME0041 Presentation 49 (17:20-17:35)**

Applied Fuzzy Multi-Objective with  $\alpha$ -Cut Analysis for Optimizing Supply Chain Master Planning Problem

**Noppasorn Sutthibutr** and Navee Chiadamrong

Sirindhorn International Institute of Technology (SIIT), Thammasat university, Thailand

*Abstract*—Providing an efficient supply chain master planning is vital to companies to achieve competitive advantage. In this point of view, we propose the fuzzy multi-objective linear model with  $\alpha$ -cut analysis to achieve the optimal supply chain master planning in an uncertain environment. The supply chain master planning problem; one manufacturer, multiple suppliers, and multiple distribution centers, is considered under two conflicting objectives where operating costs, demand, and production capacity are imprecise. The first objective is to minimize the total costs of logistics and the other objective is to maximize total value of purchasing. The proposed model and solution method are validated through numerical example. Computational results indicate that  $\alpha$ -cut analysis is introduced to ensure decision makers that the result satisfies their preferences based on a specified minimum allowed satisfaction value ( $\alpha$ ).

**Dinner 18:20-19:20**

# Poster session

**May 25, 2019 (Saturday)**

**Time: 10:40~15:50**

**Venue: Orchid Convention Hall (Part B), Hotel Phuket Orchid Resort and Spa**

## **ME0003** Poster 1

Study on Optimization of a Multi-Location Inventory Model with Lateral Transshipment Considering Priority Demand

**Xiaoyuan Yan**, Zhonghao Zhao and Boping Xiao

School of reliability and systems engineering, Beihang University, China

*Abstract*—For complex systems, often a variety of equipment with different priorities require a spare. Spares supply management constitutes a fundamental decision-making problem, especially in systems which require high support levels. Considering the priority demand classes in actual spares supply, a two-echelon and multi-location continuous review inventory model with waiting time constraints is formed. To better match supply and demand, lateral transshipments and emergency shipments occur in response to stockouts. The model is to find an optimal inventory for each stock point under target service level, against a backdrop of cost minimization objective. A genetic algorithm is applied to get the results and a numerical example is presented to demonstrate the validity of the model. Finally, the proposed model manages to incentive a dexterous spares supply based on service differentiation and successfully provides a theoretical basis for decision makers to plan and control inventory.

## **ME0006** Poster 2

Selective Maintenance Modeling for a Multi-state System Considering Functionally Significant Items

**Zhonghao Zhao**, Boping Xiao and Xiaoyuan Yan

Beihang University, China

*Abstract*—Selective maintenance problem arises in many large multistate systems which are required to perform multiple missions in succession. Maintenance work can only be carried out in finite maintenance breaks between any two consecutive missions. Only a selected set of multi-state components can be taken maintenance action under limited resources such as time and cost. Traditional selective maintenance strategies do not consider Functionally Significant Items (FSI) and determine which components need to be maintained only by using maintenance resources and performance state. However, in an actual industrial environment, such as safety will also affect maintenance decisions. Therefore, it is necessary to fully consider various factors to determine FSI. In such a case, Analytic Hierarchy Process (AHP) is used to determine FSI in this paper, and then the multi-state system selective maintenance model considering FSI is established with the goal of maximizing the reliability to perform next mission. An improved genetic algorithm (GA) is employed to solve the optimization problem instead of enumeration. Finally, an example is presented to illustrate the necessity of considering FSI.

**ME0007 Poster 3**

Reliability Analysis and Maintenance Engineering of Anti-rear Device Based on Fuzzy FMECA

**Jingying Liu**, Yanguang Hu

School of Reliability and System Engineering Beihang University, China

*Abstract*—In this paper, in order to improve the comprehensive reliability of the ship and improve its maintenance engineering, the domestic anti-rear device of a marine ship in China is taken as the research. The system structure and working principle of the anti-rear device of the naval gun are analyzed. Compared with the previous FMECA method, which is difficult to obtain quantitative results after partial fuzzy description, a fuzzy comprehensive evaluation method is used to improve the FMECA method to form a fuzzy FMECA method in this paper. The selection principle of reliability key parts and the quantitative risk analysis of process failure mode are given. The functional FMECA table is obtained through fault mode data analysis. The results show that the highest damage in the manufacture of the control rod is the roughness in the grinding process. It also shows that the fuzzy FMECA is effective and has a positive effect on improving the reliability of the system. Improvement measures are proposed for this failure mode, at the same time, the maintenance engineering of the anti-rear device of the naval gun is also given.

**ME0009 Poster 4**

Based on the "structure-behavior-performance" paradigm Market analysis of Chinese down jacket industry

**Xue Jie Chen** and Gang Fang

Beijing Institute Of Fashion Technology, China

*Abstract*—Although the down jacket market in China only has a history of 20 years, the scale of the industry is expanding rapidly. With the expansion of the down jacket market demand and the popularity of down products, the competitive pressure in the down jacket market in China is also increasingly intensified. Major brands begin to adjust their market behaviors and strive to build pioneer brands. This paper mainly USES the theoretical framework of SCP paradigm to analyze the market structure, market behavior and market performance of China's down jacket industry. After judging the market structure of China's down jacket industry, this paper further explores the market behavior and performance taken by China's down jacket industry under the current market structure, and summarizes the whole paper at the end of the article.

**ME0011 Poster 5**

Analysis of Green Marketing Strategy in Garment Industry ——Take H&amp;M for example

**Xue Jie Chen** and Gang Fang

Beijing Institute Of Fashion Technology, China

*Abstract*—With the deterioration of the environment, the governments of various countries have quickened the pace of the construction of civilization, and the consciousness of environmental protection of the people of all countries has also been improved. In this situation, it is necessary for enterprises to explore the path of sustainable development. Clothing enterprises are no exception. As early as 2002, H&M began to invest in the field of environmental protection raw materials, began to explore a new model of green production of clothing, until now it has become a typical representative of the successful promotion of green marketing. This paper takes H&M as an example, analyzes its green marketing strategy from different angles, explores the influence of H&M green marketing, and according to H&M's green marketing. Strategies for the clothing industry to promote green marketing recommendations.

**ME0020 Poster 6**

Evolution Model for Word-of-Mouth Communication Based on Improved Cellular Automata

**Jiafu Su**<sup>1</sup>, Xin Yu<sup>2</sup> and Sensen Hu<sup>1</sup>

1. Chongqing Technology and Business University, China; 2. National Institute of Development Administration, Thailand

*Abstract*—From the view of the micro-interaction between customers, this paper aims to investigate the evolution process and mechanism for Word-of-Mouth (WOM) communication. First, consulting the SIS model, this work depicts the process of WOM communication employing the thought of epidemic spread. Then, this paper improves the traditional cellular automata model to better reflect the WOM communication in reality. On its basis, the WOM communication evolution model is proposed. Through simulation of the proposed model, this paper studies the evolution process of WOM communication, and the influence of the WOM introduction strategy and the accessibility of WOM between communities on WOM communication performance. The results give us a comprehensive understanding of the evolution process and mechanism of WOM communication, and reveal valuable management enlightenments about how to improve the WOM communication performance, which are helpful to the managers and decision makers to effectively carry out WOM management.

**ME0056 Poster 7**

Model of mining the synchronism of retrieval processes between customers for optimizing the import container allocation problem

**Zhou Sifang** and Zhang Qingnian

Wuhan university of technology, China

*Abstract*—The container relocation problem (CRP) is an important factor affecting the efficiency in a container terminal yard. The primal cause of the CRP is the import containers discordant storage permutation in each stack with the arrival orders of outside trucks. This paper, from the carrier or consignee perspective, expounds a methodology for mining the synchronism of retrieval processes between customers (Syn-RPC) along with a formulation to measure the level of the Syn-RPC, called the Synchronism Index of Retrieval Processes between Customers (SynI-RPC). On the basis of SynI-RPC, an optimizing scheme is put forward, which involves three phases—grouping with SynI-RPC, yard block allocation problem (BAP), and slot allocation problem (SAP). In addition, a retrieval order estimation approach for the import containers is developed for applying to the SAP, called Frequency Difference in Different Episodes of Retrieval Time Window (FD/RTW). Computational experiments validate the novel strategy effectiveness and efficiency on abatement of the expected number of rehandles.

**ME0082** Poster 8

Minimizing idle time in two sided assembly line balancing using exact search approach

**Ashish Yadav** and Sunil Agrawal

Indian institute of information technology design and manufacturing jabalpur, India

*Abstract*—Growing interests of customers in customized products and increasing competitions between companies to configure and balance their manufacturing systems more effectively within limited space and time. Two-sided assembly lines are usually constructed to produce large-sized high volume products such as buses, trucks, automobiles, and some domestic products

In this paper, the proposed mathematical model is applied to solve benchmark problems of two-sided assembly line balancing problem to maximize the workload on each workstation which tends to increase the compactness in the beginning workstations which also helps to minimize the length and idle time of the line. Since the problem is well known as np-hard problem a lingo solver based solution method is proposed to solve the problem. Through computational experiments, the performance of the proposed Lingo model is checked with various benchmark problem instances. Based on the computational results, idle time in mated stations and the length of the mated station's line is decreased.

**ME3001** Poster 9

Analysis on the Differences of Capital Structure Industry of Chinese Listed Companies and Their Changing Trends

**Yuan Jie**

West Anhui University, China

*Abstract*—The capital structure of enterprises is the embodiment of enterprise financing decisions. Understanding the trend of changes in corporate capital structure is of great significance for understanding the financing behavior of enterprises. This paper uses the panel data of China's A-share listed companies from 2007 to 2017 to reveal the different capital structures of listed companies in different industries. The study found that the capital structure of listed companies in China fluctuated between 2007 and 2013, and remained at a relatively stable level from 2013 to 2017. From a macro perspective, the trend of changes in the capital structure of enterprises and the prosperity index of GDP and economic environment shows a clear consistency. It can be seen that the trend of capital structure changes of listed companies is affected by external economic environment factors. From the perspective of industry differences, the capital structure of each industry has obvious industry characteristics. There is a significant difference in the average level of capital structure between different industries, and it has universality and stability in time. Chinese listed companies should consider their own industry capital structure. The overall trend of change and its influencing factors rationally optimize its own capital structure.

**ME3003** Poster 10

A Study of Factors Influencing Students' Decision to Pursue to Tertiary Education

**Rizki Hafidhul Jalaluddin**, Cheah Megan and Loh Yue Fang

Faculty of Business and Information Science, UCSI University, Malaysia

*Abstract*—There are many underlying factors that may influence the students to make a decision to further their study in tertiary education which is a key issue for higher education institution authorities to acknowledge. Hence, the main purpose of this research is to identify the factors affecting students' decision in pursuing tertiary education. This research will be focusing on the three factors which are student attributes, social influence and financial consideration. Online questionnaires were being distributed as a primary data to the secondary school students by sharing the link with a sample size of two hundred respondents. A reliability test was conducted after the collection of data to test the reliability of the variables by referring to the Cronbach Alpha values. Multiple Linear Regression and Pearson Correlation Coefficient were used to measure the relationship between the independent variables and dependent variable. Result of this work showed that motivation, family influence and financial consideration are significantly associated with students' decision in pursuing higher education.

**ME3004** Poster 11

A Study of Oil Price and Other Contributing Factors to The Profitability of courier Companies

**Tan Jia Yin**, Law Xuen Ee and Ganeshsree Selvachandran

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*Abstract*—Oil, being a major commercial energy source in the world, its fluctuation is often interrelated with the global economy. Generally, people would perceived that earning power of transportation sectors which include airline companies, courier companies, shipping companies etc. are heavily rely on oil price fluctuation. Apparently, oil seem to be the major operating expense for those companies. As oil price goes down, we would naturally assume that transportation industry is doing well as their operating expense is low and vice versa. In our study, we are focusing on the issue of whether the profitability of courier companies are wholly depends on oil price. Comparison was done between 4 courier companies, namely Pos Malaysia, TNT Express, United Parcel Service and Deutsche Post. The data analysed were the oil price and the net profit of each courier company from year 2006 to 2014. Simple linear correlation and test –t analysis was done. The results showed that only linear relationship between oil price and net profit of TNT Express which means that the net profit of other three companies including Pos Malaysia, United Parcel Service and Deutsche Post are not mainly affected by oil price.

# One Day Visit

**May 26, 2019 (Sunday) 9:00~17:00**

Phuket is one of the southern provinces (changwat) of Thailand. It consists of the island of Phuket, the country's largest island, and another 32 smaller islands off its coast. It lies off the west coast of Thailand in the Andaman Sea. Phuket Island is connected by the Sarasin Bridge to Phang Nga Province to the north. The next nearest province is Krabi, to the east across Phang Nga Bay. Phuket Province has an area of 576 square kilometres (222 sq mi), somewhat less than that of Singapore, and is the second-smallest province of Thailand. It formerly derived its wealth from tin and rubber, and enjoys a rich and colorful history. The island was on one of the major trading routes between India and China, and was frequently mentioned in foreign ship logs of Portuguese, French, Dutch, and English traders. The region now derives much of its income from tourism. Many of the outlying islands are very popular destinations for tourists, divers and snorkelers, including the Phi Phi Islands and the Similan Islands.



The Phi Phi Islands are an island group in Thailand, between the large island of Phuket and the west Strait of Malacca coast of the mainland. The islands are administratively part of Krabi province. Ko Phi Phi Don meaning "island" in the Thai language) is the largest island of the group, and is the most populated island of the group, although the beaches of the second largest island, Ko Phi Phi Lee (or "Ko Phi Phi Leh"), are visited by many people as well. The rest of the islands in the group, including Bida Nok, Bida Noi, and Bamboo Island (Ko

Mai Phai), are not much more than large limestone rocks jutting out of the sea. The Islands are reachable by speedboats or Long-tail boats most often from Krabi Town or from various piers in Phuket Province.

Patong refers to the beach and town on Phuket's west coast. It is the main tourist resort on the island of Phuket, and is the center of Phuket's nightlife and shopping. The beach became popular with Western tourists, especially Europeans, in the late-1980s. It has numerous hotels and the area has expanded into a tourist Mecca.



**The exact tour route will be adjusted according to the situation on May, 26, 2019**

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**Note**

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