# CERTIFICATE OF PRESENTATION

**6th International Conference on Business and Information Management (ICBIM 2022)**
**Guangzhou, China (Virtual Conference)**
**August 26-28, 2022**
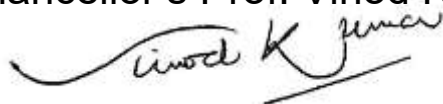
THIS CERTIFICATE IS AWARDED TO

**Paper ID:** BM4031

**Paper Title:** Conceptual Framework for Efficient Inbound Supply Chain Analytics**Presenter's**

**Name:** Mikiavonty Endrawati Mirabel, and Oviliani Yenty Yuliana

**Presenter's Affiliation:** Petra Christian University, Indonesia

Honorary Committee Chair

Chancellor's Prof. Vinod Kumar

Conference Committee

ICBIM

ICBIM 2022

# CONFERENCE PROGRAM

# ICBIM

**The 6th International Conference on Business and Information Management**

**2022**

*Virtual Conference / August 26-28, 2022*

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**Organized By:**

南方科技大学
SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY

**Co-Organized By:**

厦门理工学院
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# WELCOME ADDRESS

We are pleased to welcome you to attend The 6th International Conference on Business and Information Management (ICBIM 2022) during August 26-28, 2022. We will hold it virtual conference due to COVID-19 pandemic.

This conference program is highlighted by five outstanding Keynote Speakers and ten Invited Speakers. They are Prof. Vinod Kumar, from Carleton University, Canada; Prof. Shuanghua Yang, from Southern University of Science and Technology, China; Prof. Daniel O'Leary, from University of Southern California, USA; Prof. Ali Alshahran, from Arab Open University, Saudi Arabia; Assoc. Prof. Alton Chua, from Nanyang Technological University, Singapore; Prof. Noriyuki Suyama, from Toyo University, Japan; Prof. Chao Wang, from Beijing University of Technology, China; Prof. Popentiu Vladicescu, from University Politehnica of Bucharest, Romania; Assoc. Prof. Paniti Netinant, from Rangsit University, Thailand; Assoc. Prof. Bambang Leo Handoko, from Bina Nusantara University, Indonesia; Assoc. Prof. Sook-Ling (Linda) Chua, from Multimedia University, Malaysia; Assoc. Prof. Nithinant Thammakoranonta, from National Institute of Development Administration, Thailand; Assoc. Prof. Hongyan Lin, from Xiamen University of Technology, China; Assoc. Prof. Ronald A. Monzon, from Caraga State University Cabadbaran Campus, Philippines; and Asst. Prof. Michael Pace, from Texas A&M University, USA.

Moreover, the conference was composed of 5 technical oral sessions, topics covered: Digital Marketing and Consumption, Corporate Financial Audit and Financial Market, E-Commerce and Supply Chain, Enterprise Technology Innovation and Development, and Information Theory and Security.

With the important efforts of the whole committee, the evaluation of all the accepted papers will be performed based on the reports from anonymous reviewers, who are qualified in the field of Business and Information Management. We wish to express our sincere appreciation to all the individuals who have contributed to this conference in various ways. We would like to thank all the authors who have contributed to this conference, and also the organizing committee, reviewers, speakers, chairpersons, sponsors and all the conference participants for their support to ICBIM 2022. We wish all of you enjoy ICBIM 2022 conference!

Conference Organizing Committee
ICBIM 2022

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# TENCENT VOOV MEETING GUIDELINE

**Join a Meeting I**

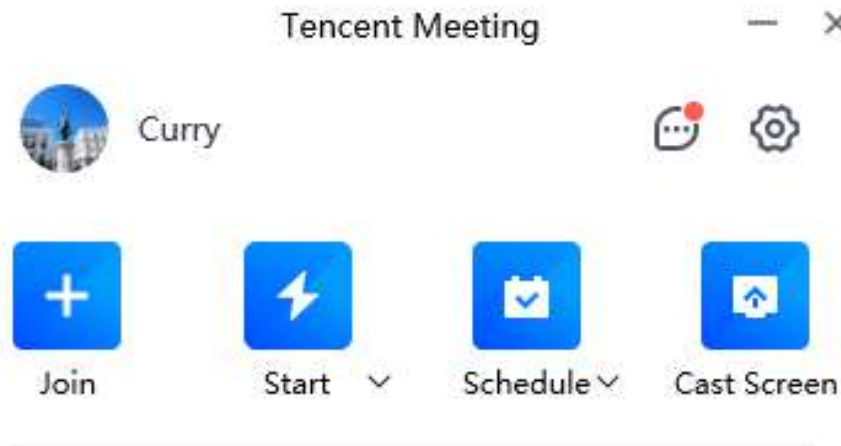Each meeting has a unique 11-digit number called a meeting ID that will be required to join a Tencent VooV meeting.

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Copy the meeting link in the browser, and join a Tencent VooV meeting

**Assistant**

For any questions during the meeting day, Send privately message to "Assistant" for help.

Audio muted and video off (both indicated by a red slash).

To share screen or contents. You should open the PPT file in ahead.

Click to open the Chat box. This will allow you to chat with Hosts and Participants.

Click to open the Settings. This will allow you to set a background.

# TENCENT VOOV MEETING GUIDELINE

**Meeting ID**

Room A | ID: 766-3437-6923

Room B | ID: 662-7242-8852

**Testing Time**

Check details of the testing time on Friday, August 26, 2022, and please join meeting room on time.

**Time Zone**

UTC/GMT+8:00
Time in Beijing
Please be aware of time difference between this and your region/country

**Name Setting**

Keynote Speaker: Keynote-Name
Committee: Position-Name  Author:
Paper ID-Name
Listener: Listener-Name

# PRESENTATION TIPS

**No-Show Policy**

A paper not presented or presented by a non-author without prior written approval by the Conference TPC will NOT be published by the publisher.

**Duration of Presentation**

A 15-minutes report, 2-3 mins question & answer included. PowerPoint file, PDF file or Pre-recorded video is accepted.

**Tips**

**Join on Time**

Please join the meeting at least 10 mins before your session starts and get your presentation prepared beforehand.

**Presentation Certificate**

Presenters will be sent to certificate after the conference event by email. An excellent presentation will be selected from each session and the presenter will receive a certificate of "Best Presentation".
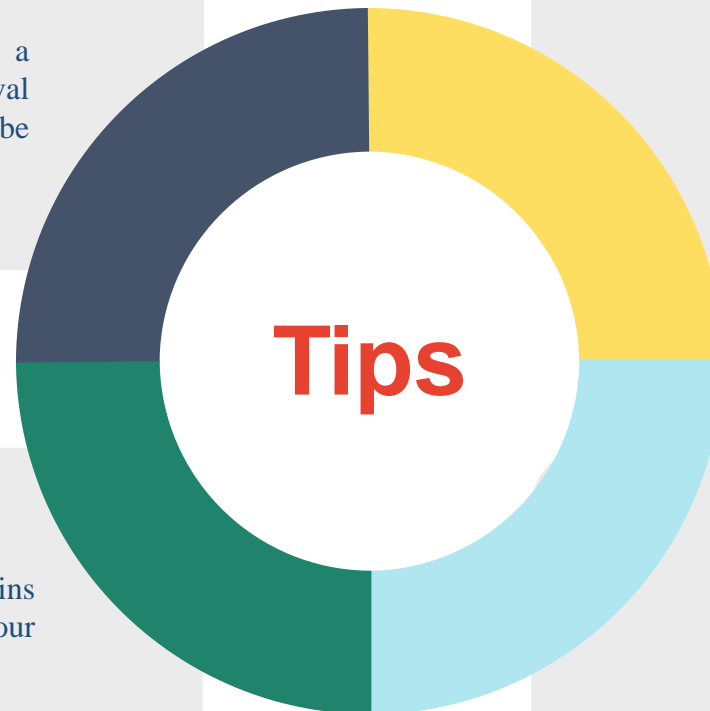
# CONFERENCE TIMETABLE

| Day 1 \| Friday \| August 26, 2022 (UTC/GMT+8) Tencent VooV Meeting Function Testing | | |
|---|---|---|
| Room Information | **Room A** Link:https://meeting.tencent.com/dm/t2E9E3e3IZCm Tencent Meeting ID:766-3437-6923 Meeting Password:202208 | **Room B** Link:https://meeting.tencent.com/dm/wAYiJRARXfTd Tencent Meeting ID:662-7242-8852 Meeting Password:202208 |
| 10:00-12:00 | **Keynote Speakers** | **Invited Speakers & Session Chairs** |
| 12:00-14:00 | **Lunch Break** | |
| 14:00-15:00 | **Technical Session 1:** | **Technical Session 1:** |
| 15:00-16:00 | **Technical Session 3:** | **Technical Session 4:** |
| 16:00-17:00 | **Technical Session 5:** | |

# CONFERENCE TIMETABLE

| Day 2 \| Saturday \| August 27, 2022 (UTC/GMT+8) Keynote Speeches & Technical Session 1, 2 | | |
|---|---|---|
| Room Information | **Room A** Link:https://meeting.tencent.com/dm/t2E9E3e3IZCm **Tencent Meeting ID:**766-3437-6923 **Meeting Password:**202208 | |
| 09:30-09:35 | *Opening Remarks* | **Prof. Shuanghua Yang** Southern University of Science and Technology, China |
| 09:35-10:15 | *Keynote Speech* | **Prof. Vinod Kumar** Carleton University, Canada |
| 10:15-10:55 | *Keynote Speech* | **Prof. Daniel O'Leary** University of Southern California, USA |
| 10:55-11:20 | *Group Photo & Break Time* | |
| 11:20-12:00 | *Keynote Speech* | **Assoc. Prof. Alton Chua** Nanyang Technological University, Singapore |
| 12:00-14:00 | *Lunch Break* | |

# CONFERENCE TIMETABLE

| | Day 2 \| Saturday \| August 27, 2022 (UTC/GMT+8)<br>Keynote Speeches & Technical Session 1, 2 | |
|---|---|---|
| Room Information | **Room A**<br>**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm<br>**Tencent Meeting ID:**766-3437-6923<br>**Meeting Password:**202208 | |
| 14:00-14:40 | *Keynote Speech* | **Prof. Ali Alshahran**<br>Arab Open University, Saudi Arabia |
| 14:40-15:20 | *Keynote Speech* | **Prof. Shuanghua Yang**<br>Southern University of Science and Technology, China |
| 15:20-16:00 | *Break Time* | |
| Room Information | **Room A**<br>**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm<br>**Tencent Meeting ID:**766-3437-6923<br>**Meeting Password:**202208 | **Room B**<br>**Link:**https://meeting.tencent.com/dm/wAYiJRARXfTd<br>**Tencent Meeting ID:**662-7242-8852<br>**Meeting Password:**202208 |
| 16:00-18:00 | *Technical Session 1* | *Technical Session 2* |

# CONFERENCE TIMETABLE

| Day 3 | Sunday | August 28, 2022 (UTC/GMT+8) Invited Speeches & Technical Session 3, 4, 5 | | |
|---|---|---|
| Room Information | **Room A** Link:https://meeting.tencent.com/dm/t2E9E3e3IZCm **Tencent Meeting ID:**766-3437-6923 **Meeting Password:**202208 | |
| 10:00-10:30 | *Invited Speech* | **Prof. Noriyuki Suyama** Toyo University, Japan |
| 10:30-11:00 | *Invited Speech* | **Prof. Chao Wang** Beijing University of Technology, China |
| 11:00-11:30 | *Invited Speech* | **Assoc. Prof. Nithinant Thammakoranonta** National Institute of Development Administration, Thailand |
| 11:30-12:00 | *Invited Speech* | **Assoc. Prof. Hongyan Lin** Xiamen University of Technology, China |
| 12:00-13:30 | *Lunch Break* | |
| 13:30-14:00 | *Invited Speech* | **Assoc. Prof. Bambang Leo Handoko** Bina Nusantara University, Indonesia |

# CONFERENCE TIMETABLE

| | | |
|---|---|---|
| **Day 3 | Sunday | August 28, 2022 (UTC/GMT+8)** <br> **Invited Speeches & Technical Session 3, 4, 5** | | |
| Room Information | **Room B** <br> **Link:**https://meeting.tencent.com/dm/wAYiJRARXfTd <br> **Tencent Meeting ID:**662-7242-8852 <br> **Meeting Password:**202208 | |
| 10:00-10:30 | *Invited Speech* | **Asst. Prof. Michael Pace** <br> Texas A&M University, USA |
| 10:30-11:00 | *Invited Speech* | **Assoc. Prof. Paniti Netinant** <br> Rangsit University, Thailand |
| 11:00-11:30 | *Invited Speech* | **Assoc. Prof. Sook-Ling (Linda) Chua** <br> Multimedia University, Malaysia |
| 11:30-12:00 | *Invited Speech* | **Assoc. Prof. Ronald A. Monzon** <br> Caraga State University Cabadbaran Campus, Philippines |
| 12:00-13:30 | *Lunch Break* | |
| 13:30-14:00 | *Invited Speech* | **Prof. Popentiu Vladicescu** <br> University Politehnica of Bucharest, Romania |

# CONFERENCE TIMETABLE

| | Day 3 \| Sunday \| August 28, 2022 (UTC/GMT+8) <br> Invited Speeches & Technical Session 3, 4, 5 | |
|---|---|---|
| Room Information | **Room A** <br> **Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm <br> **Tencent Meeting ID:**766-3437-6923 <br> **Meeting Password:**202208 | **Room B** <br> **Link:**https://meeting.tencent.com/dm/wAYiJRARXfTd <br> **Tencent Meeting ID:**662-7242-8852 <br> **Meeting Password:**202208 |
| 14:00-14:30 | *Break Time* | |
| 14:30-16:15 | *Technical Session 3* | *Technical Session 4* |
| 16:15-16:30 | *Break Time* | |
| Room Information | **Room A** <br> **Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm <br> **Tencent Meeting ID:**766-3437-6923 <br> **Meeting Password:**202208 | |
| 16:30-18:15 | *Technical Session 5* | |

# KEYNOTE SPEAKER

## Prof. Vinod Kumar
## Carleton University, Canada

**Speech Time:** 09:35-10:15, August 27, 2022 (UTC/GMT+8)

**Room A**
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

Dr. Vinod Kumar is a Chancellor's Professor of Technology and Supply Chain Management of the Sprott School of Business (Director of Sprott School, 1995-2005), Carleton University, Ottawa, Canada. Dr. Kumar has published over 400 articles in refereed journals and proceedings other than publishing dozens of books and monographs; his articles have been cited over 9000 times. He has won several Best Paper Awards in prestigious conferences, Scholarly Achievement Award of Carleton University for the academic years 1985-86 and 1987-88, Research Achievement Award for the year 1993, 2001, 2007 and 2015, and the Graduate Mentoring Award in 2011. Dr. Kumar has widely consulted industry and government. He is co-editor of one, associate-editor of another and on the editorial board of six International Journals. In addition, Dr. Kumar has also served for several years on the Board of Governors and the Senate for Carleton University and on the Board of the Ontario Network of e-Commerce. Dr. Kumar's research interests are in optimizing performance of operation systems; supply chain sustainability; technology transfer; new product development; technology adoption; e-commerce applications and e-Government. He is on Canadian Who's Who since last several years.

# KEYNOTE SPEAKER

## Prof. Vinod Kumar
## Carleton University, Canada

**Speech Time:** 09:35-10:15, August 27, 2022 (UTC/GMT+8)

**Room A**
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

**Speech Title:** Acceptance of Autonomous Systems in Personal Care of Elderly: The Issue of Technology's Trustworthiness

**Abstract:** Significant advancements in recent years in the area of elderly personal care have happened. Such autonomous systems include Care robots, emotional companion robots, smart home products, and wearable devices. They look like a promising solution to the acute shortage of elderly support/care workers. Our research program focuses on understanding the adoption behaviour of the elderly in adopting these technological devices. Literature has successfully argued that such autonomous homecare systems can ensure independence for elderly people and increase cooperation, social interaction, and adaptation. However, the question of technology's Trustworthiness for elderly users is not addressed.

In our recent research published in "The Journal of Technological Forecasting & Social Change (2021)," we studied the elderly's behavioral intention to adopt in terms of their trust in such devices as a replacement of human care/support. (Click to read more)

# KEYNOTE SPEAKER

## Prof. Daniel O'Leary
## University of Southern California, USA

**Speech Time:** 10:15-10:55, August 27, 2022 (UTC/GMT+8)

### Room A
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

Daniel E. O'Leary is a tenured full professor at the University of Southern California (USC), in the Marshall School of Business. He received his Ph. D. from Case Western Reserve University and his master's degree in management science and statistics from the University of Michigan. Dan formerly worked with KPMG in their consulting practice. Professor O'Leary recently was named a Fulbright – Hays Scholar recipient and was a co-author on a paper that was named the winner of the 2020 Paul Gray "Thought Provoking" Paper award. Professor O'Leary's book, Enterprise Resource Planning Systems book, published by Cambridge University Press has been translated into both Russian and Chinese. Professor O'Leary's research focuses primarily on the use of emerging technologies, big data and artificial intelligence in business.

# KEYNOTE SPEAKER

## Prof. Daniel O'Leary
## University of Southern California, USA

**Speech Time:** 10:15-10:55, August 27, 2022 (UTC/GMT+8)

### Room A
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

**Speech Title:** Massive Data Language Models and Conversational AI: Emerging Issues

**Abstract:** Google's LaMDA, Open AI's GPT-3 and Meta's BlenderBot are artificially intelligent (AI) based chatbots, that have been trained on billions of documents creating the notion of "Massive Data." These systems use human generated documents to capture words and relationships between words that people use when they communicate. This paper examines some of the similarities of these systems and examines some of the emerging issues regarding these massive data language models, including whether they are sentient, the use and impact of scale, information use and ownership, explanation of discussion and answers and other concerns. This paper also directly investigates some artifacts of Google's LaMDA, and compares them with Meta's BlenderBot. Finally, this paper examines some emerging issues and questions deriving from our analysis.

# KEYNOTE SPEAKER

### Assoc. Prof. Alton Chua
### Nanyang Technological University, Singapore

**Speech Time:** 11:20-12:00, August 27, 2022 (UTC/GMT+8)

### Room A
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

Dr Alton Chua is currently Associate Professor, and Department Lead, Information and Knowledge Sciences at the Wee Kim Wee School of Communication and Information, Nanyang Technological University (NTU), Singapore. As an active scholar with a research interest in information and knowledge management, he has attracted more than S$2 million worth of research grants and has published in nearly 200 peer-reviewed journal articles and conference papers, a number of which are award-winning. He is an editorial board member of several high impact journals such as the Journal of Knowledge Management and the Journal of Information Science, and has served as the Chair of the ASIS&T SIG-KM.

# KEYNOTE SPEAKER

**Assoc. Prof. Alton Chua**
**Nanyang Technological University, Singapore**

**Speech Time:** 11:20-12:00, August 27, 2022 (UTC/GMT+8)

**Room A**
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

**Speech Title:** Information Management in the Sharing Economy

**Abstract:** As an innovative economic and cultural force, the sharing economy has been defined by three characteristics, namely digital platforms as the key driver, peer-to-peer operations where users are both service providers and consumers, and the economic logic of access rather than ownership. Scholars have tried to unravel the sharing economy from different perspectives including business models, consumer behavior and government regulations. In this presentation, I will try to sketch the research landscape of the sharing economy from a corpus of published works. The purpose is to offer research directions in which interested information management scholars can pursue as well as highlight where various collaboration opportunities exist. Hopefully, our understanding of the ever-evolving sharing economy can be enriched though the lens of information management.

# KEYNOTE SPEAKER

**Prof. Ali Alshahran**
**Arab Open University, Saudi Arabia**

**Speech Time:** 14:00-14:40, August 27, 2022 (UTC/GMT+8)

**Room A**
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

Dr. Al-Shahrani has been the President of the Arab Open University in Saudi Arabia since 2018. He holds a PhD in Cryptography and Information Security from University of Essex, UK, and a Master's Degree in Computer and Information Networks from the same university. Dr. Al-Shahrani and his work have been appreciated in many forums, where he received several scientific awards, including the award for the best research paper in the Third International Conference sponsored by the IEEE Institute, on Digital Information, Networks and Wireless Communications (DINWC2015), Moscow, Russia. Moreover, a certificate of excellence for the report of academic progress and research submitted by University of Essex for two consecutive years.

Under his administration, a number of technical projects and initiatives have been implemented, and he also had initiatives and contributions to community service, as well as contributions and solutions to handling and overcoming the effects of the Corona pandemic for some educational and charitable agencies. Dr. Al-Shahrani has many research interests, the most important of which are information security, mobile payment system, and E-Learning, and he has many research papers published in scientific journals and conferences.

# KEYNOTE SPEAKER

**Prof. Ali Alshahran**
**Arab Open University, Saudi Arabia**

**Speech Time:** 14:00-14:40, August 27, 2022 (UTC/GMT+8)

**Room A**
**Link:** https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:** 766-3437-6923
**Meeting Password:** 202208

**Speech Title:** Implications of Covid-19 on Education

**Abstract:** Education and educational systems have been evolved dramatically during the last few years. Several teaching methodologies were proposed to utilize the power of technology and empower education in all regions. The deployment and evaluation process of education system were moving forward slowly, till the sudden Covid-19 pandemic hits the world. The pandemic motivated the public and private sectors to enhance their systems and quickly adopt new teaching systems to minimize the great loss that they might face if the education process were stopped. In this talk, we go though the changes that Covid-19 make on the education systems in developing countries.

# KEYNOTE SPEAKER



## Prof. Shuanghua Yang
## Southern University of Science and Technology, China

**Speech Time:** 14:40-15:20, August 27, 2022 (UTC/GMT+8)

**Room A**
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

Prof. Shuang-Hua Yang, FIET, FInstMC, SMIEEE, is currently serving as the Vice Dean for Academic Affairs of Graduate School and a chair professor in the Department of Computer Science and engineering at SUSTech (Southern University of Science and Technology). Before joined SUSTech Professor Yang spent over 23 years in the UK Higher Education. He was the Head of Department of Computer Science at Loughborough University from 2014 to 2016. He joined Loughborough University in 1997 as a research assistant, and progressing to a research fellow in 1999, a lecturer in 2000, a senior lecturer in 2003, a professor in 2006, and Head of Department of Computer Science in 2014. He was awarded a Doctor of Science degree, a higher doctorate degree, in 2014 from Loughborough University to recognize his scientific achievement in his academic career. He is also an appointed expert at the national level in China. His research interests are mainly focused on Internet of Things and Cyber-Physical Systems. He authored four research monographs and over 200 academic papers.

# KEYNOTE SPEAKER

## Prof. Shuanghua Yang
## Southern University of Science and Technology, China

**Speech Time:** 14:40-15:20, August 27, 2022 (UTC/GMT+8)

### Room A
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

**Speech Title:** A Systematic Way of Identifying Contradictions within Safety and Security Requirements for Industrial Cyber-Physical Systems

**Abstract:** Industrial cyber-physical systems (iCPSs) refer to the next generation of industrial systems that integrate information and physical spaces through control, communication, and computation. As a backbone of the fourth industrial revolution, iCPSs map industrial processes to the information space through the network, then monitor and control them and make intelligent decisions in real-time. Compared to CPSs that focus on other physical processes, iCPSs place more emphasis on real-time control, interoperability of components, and dynamic deployment of systems. These characteristics need to be considered during the entire lifecycle of iCPSs, i.e., requirement specification, system design, operation, and maintenance.
Due to the nature of networked systems, iCPSs are exposed to risks from both physical and information spaces. Safety and security (S&S) are the keys to reducing these risks. Safety prevents iCPSs from accidental actions in physical space (i.e., hazards), while security protects iCPSs from intentional and unintentional attacks in information space (i.e., threats). We collectively refer to threats and hazards as "risks" in line with the Society for Risk Analysis Glossary. (Click to read more)

# INVITED SPEAKER

## Prof. Noriyuki Suyama
## Toyo University, Japan

**Speech Time:** 10:00-10:30, August 28, 2022 (UTC/GMT+8)

**Room A**
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

Noriyuki Suyama was born in Tokyo. He is a Professor in Toyo University. His publications and research interest focus primarily on Global Marketing and Customer Relationship Management with quantitative methods. He received an undergraduate degree in Economics from Sophia University in Tokyo, M.B.A. in Marketing from University of Rochester, NY, M.S. in Econometrics and Ph.D. in Marketing from Senshu University in Tokyo.

He started business career at Daimaru Co. Ltd., one of major department store chains in Japan and was mainly involved in merchandising and marketing activities as a manager. He moved to Rakuten Inc., No.1 electric commerce firm in Japan and was double-assigned to general manger positions in merchandising division and client marketing division. He was also engaged in commercial real estate management and food business as a general manager and a CEO, respectively in overseas markets. His overseas assignment totals more than 10 years, mainly in Southeast Asia.

Currently, he is also an adjunct faculty of Marketing Research and International Marketing at Metropolitan University of Tokyo and Sophia University, respectively.

Dr. Suyama belongs to Japanese Society of Marketing and Distribution, Japan Marketing Academy, Japan Society for Southeast Asia Studies, Fashion Business Association and Japan Halal Association. He is a member of Gerson Lehrman Group (GLG) Council, who consults with clients.

# INVITED SPEAKER

## Prof. Noriyuki Suyama
## Toyo University, Japan

**Speech Time:** 10:00-10:30, August 28, 2022 (UTC/GMT+8)

**Room A**
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

**Speech Title:** Effects of COVID-19 Pandemic on Japanese People's Lifestyles

**Abstract:** The purpose of the paper is to understand the difference of before vs. after COVID-19 pandemic and Japanese people living in Japan. Subsequently, examining the analysis results help obtain useful insights into new business models for business parties in Japan as a micro-leveled perspective. The paper also tried to explore future conditions of globalization by taking into consideration nation's political and economic changes as a macro-leveled perspective. The COVID-19 has been spreading across the world with more than 513 million with 6.2 million deaths confirmed cases in 190 countries as of 01 May, 2022. In this pandemic, consumer lifestyles have to change as people's range of activities is restricted. In general, consumers tend to think of new ways to carry out their daily activities when they are difficult to execute. For example, if the government forces its citizens to refrain from going out, they will try to center their work and social life around their homes. Even if the pandemic is over and things are back to normal, people will not revert to exactly the same lifestyle as before. The impact of COVID-19, such as a digitalized work style all at once and a life where people spend most of their time at home, will change their lives before and after the COVID-19 pandemic. (Click to read more)

# INVITED SPEAKER



**Asst. Prof. Michael Pace**
**Texas A&M University, USA**

**Speech Time:** 10:00-10:30, August 28, 2022 (UTC/GMT+8)

**Room B**
**Link:**https://meeting.tencent.com/dm/wAYiJRARXfTd
**Tencent Meeting ID:**662-7242-8852
**Meeting Password:**202208

Dr. Michael Pace (USA) is an Executive Assistant Professor at Texas A&M University's Mays Business School and Faculty Affiliate of Texas A&M's Energy Institute. His responsibilities include instruction in Project Management, Strategy, Entrepreneurship, and Managing Sustainable Business; leading study abroad programs to multiple locations (his goal is to teach on each continent); and advising student organizations (Phi Beta Lambda & the Aggie Product Management Club). He has delivered keynotes, workshops, and training worldwide on project management, especially on method customization; written several books & articles on project management; and founder of the consulting firm Diverging Roads. Outside of academia, Dr. Pace has spent almost 2 decades building or fixing project management functions across a diverse set of clients - including financial institutions, government agencies, biotech firms, and telecommunication companies. Dr. Pace is President of IPMA-USA.

# INVITED SPEAKER

**Asst. Prof. Michael Pace**
**Texas A&M University, USA**

**Speech Time:** 10:00-10:30, August 28, 2022 (UTC/GMT+8)

**Room B**
**Link:**https://meeting.tencent.com/dm/wAYiJRARXfTd
**Tencent Meeting ID:**662-7242-8852
**Meeting Password:**202208

**Speech Title:** Sustainable Business: forcing divergent disciplines together

**Abstract:** There is division on effective cross-fertilization of ideas between research domains, with some studies showing collaboration increases such sharing of ideas while others show encapsulation, an illusion of sharing, and increased containment. This is a challenge for the realm of sustainable business. Experts in the sciences may be novices regarding business acumen, and business persons lack the necessary scientific knowledge to inform decisions. Therefore, the disciplines must determine how to effectively come together. The present discussion provides a systematic review of the literature regarding cross-fertilization and collaboration between research disciplines, including recommendations for increasing the effectiveness of interdisciplinary research in sustainable business.

# INVITED SPEAKER

**Prof. Chao Wang**
**Beijing University of Technology, China**

**Speech Time:** 10:30-11:00, August 28, 2022 (UTC/GMT+8)

**Room A**
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

Dr. Chao Wang is a professor in the College of Economics and Management, Beijing University of Technology, China. He received a Ph.D. from Beijing Jiaotong University (BJTU) in 2015 with joint training at Purdue University in 2013 and 2014. He was a postdoctoral fellow at the Centre for Polymer Studies and Department of Physics of Boston University from 2017 to 2019. His research interests include complexity economics, sustainable supply chains, and complex networks. He has published over 70 papers in various journals, such as Omega, Resources, Conservation and Recycling, Cities, Ecological Economics, Transportation Research Part A/D, and Applied Energy.

# INVITED SPEAKER

## Prof. Chao Wang
## Beijing University of Technology, China

**Speech Time:** 10:30-11:00, August 28, 2022 (UTC/GMT+8)

## Room A
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

**Speech Title:** Structure of the global plastic waste trade network and the impact of China's import Ban

**Abstract:** Millions of tonnes (teragrams) of plastic waste are traded around the world every year, which plays an important role in partially substituting virgin plastics as a source of raw materials in plastic product manufacturing. In this paper, global plastic waste trade networks (GPWTNs) from 1988 to 2017 are established using the UN-Comtrade database. The spatiotemporal evolution of the GPWTNs is analyzed. Attention is given to the country ranks, inter- and intra-continental trade flows, and geo-visual communities in the GPWTNs. We also evaluate the direct and indirect impacts of China's plastic waste import ban on the GPWTNs. The results show that the GPWTNs have small-world and scale-free properties and a core-periphery structure. The geography of the plastic waste trade is structured by Asia as the dominant importer and North America and Europe as the largest sources of plastic waste. China is the unrivaled colossus in the global plastic waste trade. After China's import ban, the plastic waste trade flows have been largely redirected to Southeast Asian countries. Compared with import countries, export countries are more important for the robustness of GPWTNs. (Click to read more)

# INVITED SPEAKER



## Assoc. Prof. Paniti Netinant
## Rangsit University, Thailand

**Speech Time:** 10:30-11:00, August 28, 2022 (UTC/GMT+8)

### Room B
**Link:**https://meeting.tencent.com/dm/wAYiJRARXfTd
**Tencent Meeting ID:**662-7242-8852
**Meeting Password:**202208

Paniti Netinant is a native of Bangkok. He is an Associate Professor of Computer Science at Rangsit University. He is currently the associate dean of the graduate school at Rangsit University. He is responsible for information technology and international affairs at the graduate school. He graduated with second class honors from Bangkok University in Thailand with a bachelor's degree in computer science. He earned a master's degree in computer science and a doctorate in computer science from the Illinois Institute of Technology in Chicago, Illinois, United States of America. He was a recipient of research grants from the Thai government. As a senior consultant, he worked in both the private and public sectors. Additionally, he is an associate editor for the SCOPUS-indexed Journal of Current Science and Technology and serves as Editor-in-Chief of the Journal of Digital Business and Social Science. He is particularly interested in data modeling and framework development, information technology design and development, the Internet of Things, information layers and services, and information management. He has recently chaired international conferences such as ICSIM 2022, ICEEG 2022, and ICFECT 2022 and served on their technical committees. He has published in several international journals and proceedings, including ACM Communications, ACM Computing Surveys, ACM Proceedings, IEEE Proceedings, Journal of Information and Communication Technology, TEM Journal, and Journal of Current Science and Technology.

# INVITED SPEAKER

## Assoc. Prof. Paniti Netinant
## Rangsit University, Thailand

**Speech Time:** 10:30-11:00, August 28, 2022 (UTC/GMT+8)

### Room B
**Link:**https://meeting.tencent.com/dm/wAYiJRARXfTd
**Tencent Meeting ID:**662-7242-8852
**Meeting Password:**202208

**Speech Title:** Design Adaptability and Flexibility of Information Management System Framework for Graduate School Services

**Abstract:** In the digital age, the transformation of a traditional organization into an electronic university has become widespread. One of the resolutions is an adapted information system for analyzing, designing, and developing software to support and manage the complex business logics, functions, and information of the smart university. The practical outcome of this article is to ensure that end users can access and use digital services anywhere and at any time during coronavirus outbreaks. This article aims to describe the information management architecture and design a graduate information management framework. The layered software management framework explains how to develop software-functional information systems and how to manage and implement them. Software functionaries enable the decomposition of software into components for the purpose of increasing software quality. The conclusion of this article is to integrate the graduate school information service and management in order to facilitate smart university processes. The system's conceptual design can be applied in any department involving stakeholders in a smart university. (Click to read more)

# INVITED SPEAKER

## Assoc. Prof. Nithinant Thammakoranonta
## National Institute of Development Administration, Thailand

**Speech Time:** 11:00-11:30, August 28, 2022 (UTC/GMT+8)

### Room A
**Link:** https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:** 766-3437-6923
**Meeting Password:** 202208

Nithinant Thammakoranonta is now an associate professor in Information Systems Management department, School of Applied Statistics, National Institute of Development Administration, Thailand. Her research interests are Strategic Information Systems, Decision Support Systems and Business Intelligence, Knowledge Management, and Green IT. She earned her Phd. In Industrial Management from Clemson University, Ms. in Information Systems from Virginia Commonwealth University, and BSc. in Statistics from Chulalongkorn University. She joined many projects about process innovations, ICT master plan development, and strategic evaluation. Currently, she has joined a lot of business process redesign and innovation projects in many industrial sectors. These projects allow her to bring her knowledge about Information Systems Development, decision model, data quality, and data and information security to build the organization's strategic competencies and sustainability. The experience received from these projects leads to concern about the important of Information Systems management, knowledge management, green ICT, especially the systems that support individual's tacit knowledge.

# INVITED SPEAKER

**Assoc. Prof. Nithinant Thammakoranonta**
**National Institute of Development Administration, Thailand**

**Speech Time:** 11:00-11:30, August 28, 2022 (UTC/GMT+8)

**Room A**
**Link:** https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:** 766-3437-6923
**Meeting Password:** 202208

**Speech Title:** Using Knowledge Management along with Information Systems for being High-Performed Organizations

**Abstract:** To use data and knowledge to increase performance of any organizations, many organizations have focused on collecting data in many formats and managing data in many forms, as well as encouraging their internal units to involve in data sciences, data analytics, or machine learning. Organizations as study cases have shown that data and knowledge collected separately within each working group. Standards definition of data and information are set within groups having same knowledge and experience. The data are shared among working groups which have same knowledge backgrounds, same as analytic results and interpretations. The information and knowledge received from the data analytics still be used for only one specific group and interpretation are done by only experts with a specific discipline. Any decision made still based on the agreement of the group regardless of the information or data interpretation received. Current information technologies used in organizations comparing to the knowledge management activities have shown that the knowledge management process currently have been incomplete and inefficient. Identifying data and knowledge needed have not referring directly to business processes. (Click to read more)

# INVITED SPEAKER

## Assoc. Prof. Sook-Ling (Linda) Chua
## Multimedia University, Malaysia

**Speech Time:** 11:00-11:30, August 28, 2022 (UTC/GMT+8)

### Room B
**Link:**https://meeting.tencent.com/dm/wAYiJRARXfTd
**Tencent Meeting ID:**662-7242-8852
**Meeting Password:**202208

Sook-Ling (Linda) Chua received her PhD in computer science from Massey University, New Zealand. She is currently an associate professor in the Faculty of Computing and Informatics at Multimedia University, Malaysia. Her main research interest is in machine learning, particularly to address problems in sensor-based activity recognition. While still working in this area, her other research interests include learning from imbalanced data, application of information-theoretic approaches to feature selection, probabilistic modelling and data analytics. She has secured various grants as principal investigator and published in various reputable journals and conferences.

# INVITED SPEAKER

## Assoc. Prof. Sook-Ling (Linda) Chua
## Multimedia University, Malaysia

**Speech Time:** 11:00-11:30, August 28, 2022 (UTC/GMT+8)

**Room B**
**Link:**https://meeting.tencent.com/dm/wAYiJRARXfTd
**Tencent Meeting ID:**662-7242-8852
**Meeting Password:**202208

**Speech Title:** Predicting Activities of Daily Living with Spatio-Temporal Information

**Abstract:** Almost every country in the world is experiencing a growing and aging population. The smart home is considered a viable solution to address living problem, typically the elderly or those with diminished cognitive capabilities. An important part of the functioning of smart homes is to monitor user's daily activities and detect any alarming situations. Most people, when performing their daily activities, interact with multiple objects both in space and through time. The interactions between user and objects in the home can provide rich contextual information in interpreting human activity. This paper discusses the importance of spatial and temporal information for reasoning in smart homes and how such information is represented for activity recognition.

# INVITED SPEAKER

## Assoc. Prof. Hongyan Lin
## Xiamen University of Technology, China

**Speech Time:** 11:30-12:00, August 28, 2022 (UTC/GMT+8)

**Room A**
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

Assoc. Prof. Hongyan Lin has done visiting research at the University of Furtwangen, Germany and Oklahoma State University, USA. She has undertaken one general project of Fujian Provincial Social Science Foundation, one research project of Fujian Provincial Department of Education, two university-level research projects, and participated in many humanities and social science projects of the Ministry of Education and Fujian Provincial Social Science Foundation, as well as a number of horizontal research projects.

# INVITED SPEAKER

**Assoc. Prof. Hongyan Lin**
**Xiamen University of Technology, China**

**Speech Time:** 11:30-12:00, August 28, 2022 (UTC/GMT+8)

**Room A**
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

**Speech Title:** Analysis of consumers' Intention to continue Using Self-service Technology - Take the Restaurant as An Example

**Abstract:** Self-ordering through mobile phone APP or self-service terminal overturns the previous inefficient operation mode, saves consumers' dining time cost, effectively lightens the burden of service personnel, saves consumers' ordering time to some extent, saves labor cost for the catering industry and improves the efficiency of ordering. How to make consumers obtain satisfactory consumption experience through self-service technology is the key for merchants to win consumers' willingness of continuous use. Therefore, this paper will start from the ECM, through the way of questionnaire survey, and then explore the influencing factors of consumers' willingness to continue to use self-service technology in the catering industry. The research results of this paper are that social influence, time pressure are main factors impacting on the expectation confirmation, while the influencing of expectation confirmation on the consumers' willingness of continuous use is through the satisfaction. These results are conducive to promote the healthy development of the catering industry, and provide some reference for catering enterprises in improving service quality.

# INVITED SPEAKER

**Assoc. Prof. Ronald A. Monzon**
**Caraga State University Cabadbaran Campus, Philippines**

**Speech Time:** 11:30-12:00, August 28, 2022 (UTC/GMT+8)

**Room B**
**Link:**https://meeting.tencent.com/dm/wAYiJRARXfTd
**Tencent Meeting ID:**662-7242-8852
**Meeting Password:**202208

Professor Ronald Ablan Monzon was born in Manay, Davao Oriental, Philippines on May 28, 1973. He obtained his BS in Computer Engineering and BS in Electronics Communication Engineering degrees at Saint Joseph Institute of Technology in 1996 and 1999 respectively. He earned his MS in Information Technology at Surigao State College of Technology. At present, he is pursuing his Doctor in Information Technology at the Technological Institute of the Philippines.

Prof. Monzon is the current Chairperson of the Department of Information Technology, College of Engineering and Information Technology at Caraga State University Cabadbaran City. He has twenty-six years' experience of in teaching and training in the field of information technology. He is one of the active members of the Accrediting Agency of Chartered Colleges and Universities in the Philippines (AACCUP). He has served as an accreditor often (10) prestigious state colleges and universities in the Philippines.

Added to these achievements, he has presented and published journals at local, regional, national, and international levels. His research interests include data mining and machine learning. Prof. Monzon is known to his colleagues and students as a responsible, trustworthy, and supportive mentor. Moreover, he is willing to work under pressure, dedicated to his work, and perform duties beyond the regular teaching hours.

# INVITED SPEAKER

**Assoc. Prof. Ronald A. Monzon**
**Caraga State University Cabadbaran Campus, Philippines**

**Speech Time:** 11:30-12:00, August 28, 2022 (UTC/GMT+8)

**Room B**
Link:https://meeting.tencent.com/dm/wAYiJRARXfTd
**Tencent Meeting ID:**662-7242-8852
**Meeting Password:**202208

**Speech Title:** Correlation of BSIT Grades to the Employment Alignment in IT Related Job Using and Bayesian Algorithm

**Abstract:** Every year there is momentous growth in the number of graduates molded by the higher education institution. the number of graduates is increasing compared to the job openings in the market. the data mining proceunderpining of the numerous types of research from the dataset obtained from the Caraga state university cabadbaran campus. this study aimed to determine the correlation of BSIT grades to the employment alignment in it-related jobs using the bayesian algorithm of Caraga state university cabadbaran campus from 2015-to 2018. the study produce that the bayesian algorithm gathered 177 total number graduates from 2015-2018 only 88.5 or 50% answered that they are working related to their field specialization in information technology (it also already permanent employees. the 72 or 40.688% number of students graduates answered that they are working but not aligned in their field specialization but they are permanent employees. there are 18 or 10.17% resigning and still finding a new job and they are also graduate students taking care of their babies. this study would help the students and university to increase the various aspect of education the student and see to it that they would yield quality education in the succeeding years.

# INVITED SPEAKER

## Assoc. Prof. Bambang Leo Handoko
## Bina Nusantara University, Indonesia

**Speech Time:** 13:30-14:00, August 28, 2022 (UTC/GMT+8)

**Room A**
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

Associate Professor Bambang Leo Handoko, academics and practitioners in the field of Auditing. Experience as auditor in public accounting firm, internal auditor for corporations and auditor for securing vital objects of the National Police Headquarters. He is an expert in financial auditing, forensic accounting, information technology auditing and also e-business. He has had many international publications in reputable journals and proceedings with many citation and acknowledgement from international researchers. He had won a lot of research grant from institution and government. Currently work as Subject Content Coordinator Auditing in Accounting Department, Faculty of Economic and Communication, Bina Nusantara University of Indonesia. He also technical committee in many reputable journal publisher and earn Scopus hi Index.

# INVITED SPEAKER

## Assoc. Prof. Bambang Leo Handoko
## Bina Nusantara University, Indonesia

**Speech Time:** 13:30-14:00, August 28, 2022 (UTC/GMT+8)

**Room A**
**Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm
**Tencent Meeting ID:**766-3437-6923
**Meeting Password:**202208

**Speech Title:** Analysis of Factors Affecting Accounting Information System Performance in Banking Sector

**Abstract:** Accounting information systems is very important in the institution to support the growth performance of the institution. Therefore, it is necessary also an accounting information system supported by computerized information technology. This study to determine whether user involvement, personal technical ability, training and education programs, top management support, and system development formalization affect the accounting information system performance at banking company. The sample used in this study was obtained from the respondents which is employee of private national bank who used accounting information system in work. The analysis technique used is ordinary least square, multiple linear regression analysis. The results showed that user involvement, personal technical ability, training and education programs, top management support, and system development formalization have a significant effect on accounting information system performance.

# INVITED SPEAKER

**Prof. Popentiu Vladicescu**
**University Politehnica of Bucharest, Romania**

**Speech Time:** 13:30-14:00, August 28, 2022 (UTC/GMT+8)

**Room B**
**Link:**https://meeting.tencent.com/dm/wAYiJRARXfTd
**Tencent Meeting ID:**662-7242-8852
**Meeting Password:**202208

Professor Florin Popenţiu Vlădicescu, was born on 17 September 1950, graduated in Electronics and Telecommunications from University POLITEHNICA of Bucharest in 1974, holds a PhD in Reliability since 1981. He has been appointed Director of the "UNESCO Chair in Information Technologies Department" at University of Oradea. Also, he is UNESCO Professor to University "Politehnica" of Bucharest, Faculty of Automatic Control and Computer Science. Professor Florin Popenţiu Vlădicescu is the founder of the first "UNESCO Chair of Information Engineering" , in UK, established at City University London, in 1998. Dr. Florin POPENTIU VLÃDICESCU is at present a Phd Supervisor at the Military Technical Academy " Ferdinand I ". Prof. Florin POPENTIU VLÃDICESCU has published over 200 papers in International Journals and Conference Proceedings is author of one book and co-author of 4 books and co-editor of 4 books published by Springer. Also he is IEEE Senior member. (Click to read more)

# INVITED SPEAKER

## Prof. Popentiu Vladicescu
## University Politehnica of Bucharest, Romania

**Speech Time:** 13:30-14:00, August 28, 2022 (UTC/GMT+8)

### Room B
**Link:**https://meeting.tencent.com/dm/wAYiJRARXfTd
**Tencent Meeting ID:**662-7242-8852
**Meeting Password:**202208

**Speech Title:** Software Dependability Assessment using DevOps Metrics

**Abstract:** Assessing software dependability is a major task of Total Management Dependability strongly motivated by the framework Total Quality Management and Lean Six Sigma methodology used by software organizations to improve performance and assuring constant collaboration with stakeholders. The most recent approach in improving software quality is DevOps, a merging of software development, software quality assurance, and software deployment and integration (IT operations). This paper addresses DevOps metrics useful to assess the software dependability. Both static and dynamic models are considered. Firstly, recent developments on software reliability, availability, safety, security and resilience are reviewed. In the second part, extensions of dependability metrics obtained by soft computing (fuzzy, intuitionistic-fuzzy, and neutrosophic numbers) are presented along with practical examples.

# TECHNICAL SESSION 1

## Topic: Digital Marketing and Consumption

| Day 2 \| Saturday \| 16:00-18:00, August 27, 2022 (UTC/GMT+8) | |
|---|---|
| **Room A \|** Link:https://meeting.tencent.com/dm/t2E9E3e3IZCm  Tencent Meeting ID:766-3437-6923  Meeting Password:202208<br>**Session Chair:** Assoc. Prof. Paniti Netinant, Rangsit University, Thailand<br>**Session Co-Chair:** Asst. Prof. Meennapa Rukhiran, Rajamangala University of Technology Tanwa-Ok, Thailand | |
| 16:00-16:15<br>BM4126 | **Title:** Sensible Tweets: Speech Act Filtering for Effective Sentiment Analysis<br>**Presenter:** Thad Chee<br>**Affiliation:** Old Dominion University, USA |
| 16:15-16:30<br>BM4033 | **Title:** Research on Electronic Payment in Philippine Digital Economy Industry<br>**Presenter:** Jiang Hao<br>**Affiliation:** University of the Cordilleras Baguio City, Philippines |
| 16:30-16:45<br>BM4036 | **Title:** Research on the Customer Engagement in Brand Co-creation in Online Brand Communities——From Dual Perspectives of the Individual and Environment<br>**Presenter:** Xianghui Jiang<br>**Affiliation:** Guangdong University of Foreign Studies, China |
| 16:45-17:00<br>BM4039 | **Title:** Research on Influential Factors of Attitude-Behavior Gap of Green Consumption based on Computational Experiment Method<br>**Presenter:** Hanrui Wen<br>**Affiliation:** Beijing Jiaotong University, China |

# TECHNICAL SESSION 1
## Topic: Digital Marketing and Consumption

| Day 2 | Saturday | 16:00-18:00, August 27, 2022 (UTC/GMT+8) | | |
|---|---|---|---|---|
| **Room A** | **Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm | **Tencent Meeting ID:**766-3437-6923 | | **Meeting Password:**202208 |
| **Session Chair:** Assoc. Prof. Paniti Netinant, Rangsit University, Thailand | | | | |
| **Session Co-Chair:** Asst. Prof. Meennapa Rukhiran, Rajamangala University of Technology Tanwa-Ok, Thailand | | | | |
| 17:00-17:15 BM4055-A | **Title:** A Deep Learning-based Purchase Prediction Using Customer Characteristics and Browsing Patterns<br>**Presenter:** SeongBeom Kim<br>**Affiliation:** Yonsei University, South Korea | | | |
| 17:15-17:30 BM4026 | **Title:** Evaluation of Forest Health and Maintenance Satisfaction based on Sem -- Taking Wuying National Forest Park in Heilongjiang as an Example<br>**Presenter:** Zaiming Yang<br>**Affiliation:** Harbin Engineering University , China | | | |
| 17:30-17:45 BM4124 | **Title:** Research on the Evaluation of College Student Village Officials' Willingness to Stay in Rural Areas to Start a Business based on Delphi Method and Analytic Hierarchy Process<br>**Presenter:** Wenchao Fang<br>**Affiliation:** Guangdong Polytechnic of Industry and Commerce, China | | | |
| 17:45-18:00 BM4122 | **Title:** The Role of Marketing 4.0 in the Digital Ecosystem Concept to Develop MSMEs in post-pandemic<br>**Presenter:** Gita Hindrawati<br>**Affiliation:** Institut Teknologi Bandung, Sekolah Bisnis dan Manajemen, Indonesia | | | |

# TECHNICAL SESSION 2

## Topic: Corporate Financial Audit and Financial Market

| Day 2 | Saturday | 16:00-18:00, August 27, 2022 (UTC/GMT+8) | |
|---|---|
| **Room B** \| **Link:**https://meeting.tencent.com/dm/wAYiJRARXfTd          **Tencent Meeting ID:**662-7242-8852          **Meeting Password:**202208<br>**Session Chair:** Prof. Noriyuki Suyama, Toyo University, Japan | |
| 16:00-16:15<br>BM4045 | **Title:** Impact of ESG Disclosure on Financial Performance Before and During COVID-19 Crisis in Indonesia<br>**Presenter:** Della Puspanegara, and Putriana Sulaeman<br>**Affiliation:** Bina Nusantara University, Indonesia |
| 16:15-16:30<br>BM4001 | **Title:** Entropy of Financial Stress and its impact on Stability of RMB<br>**Presenter:** Yang Zhao<br>**Affiliation:** Southeast University, China |
| 16:30-16:45<br>BM4029 | **Title:** Assessing the Formation of the Idiosyncratic Volatility Puzzle Based on EMD<br>**Presenter:** Rui Hu<br>**Affiliation:** Beijing City University, China |
| 16:45-17:00<br>BM4061 | **Title:** Perception of Potential Users on Cloud Accounting Adoption by SMEs in Indonesia: A Conceptual Framework<br>**Presenter:** Ryan Tandiono<br>**Affiliation:** Bina Nusantara University, Indonesia |

# TECHNICAL SESSION 2

## Topic: Corporate Financial Audit and Financial Market

| Day 2 | Saturday | 16:00-18:00, August 27, 2022 (UTC/GMT+8) | |
|---|---|
| **Room B |** **Link:**https://meeting.tencent.com/dm/wAYiJRARXfTd **Tencent Meeting ID:**662-7242-8852 **Meeting Password:**202208 **Session Chair:** Prof. Noriyuki Suyama, Toyo University, Japan | |
| 17:00-17:15 BM4068 | **Title:** Strategic Aggressiveness, Earnings Management and Bank Credit Financing <br> **Presenter:** Fu Jia <br> **Affiliation:** Guangdong electromechanical vocational and Technical College, China |
| 17:15-17:30 BM4059 | **Title:** The Impact of Audit Quality on Financing Constraints <br> **Presenter:** Sen Wang <br> **Affiliation:** Sichuan University, China |
| 17:30-17:45 BM4110 | **Title:** Covid-19 Pandemic Impact Towards Financial Performance of Indonesian Listed Firms: Evidence from Basic and Chemical Industry <br> **Presenter:** Enhui Xu <br> **Affiliation:** Wuhan University of Technology, China |
| 17:45-18:00 BM4062 | **Title:** Determining Factors that Effect the Use of Acounting Aplications by Accountants Using the Extended Technology Acceptance Model Integrated with Delone & Mclean is Success Model <br> **Presenter:** Agra Fausta Danasmara <br> **Affiliation:** Bina Nusantara University, Indonesia |

# TECHNICAL SESSION 3
## Topic: E-Commerce and Supply Chain

| | Day 3 \| Sunday \| 14:30-16:15, August 28, 2022 (UTC/GMT+8) | |
|---|---|---|
| **Room A** \| **Link:** https://meeting.tencent.com/dm/t2E9E3e3IZCm | **Tencent Meeting ID:** 766-3437-6923 | **Meeting Password:** 202208 |
| **Session Chair:** Assoc. Prof. Bambang Leo Handoko, Bina Nusantara University, Indonesia | | |
| 14:30-14:45<br>BM4031 | **Title:** Conceptual Framework for Efficient Inbound Supply Chain Analytics<br>**Presenter:** Oviliani Yenty Yuliana<br>**Affiliation:** Petra Christian University, Indonesia | |
| 14:45-15:00<br>BM4038 | **Title:** Research on the Interactive Relationship between Manufacturing Wages and Cross-border E-commerce Trade based on VAR Model<br>**Presenter:** Minjie Kang; and Xiaowen Wang<br>**Affiliation:** Dalian University, China | |
| 15:00-15:15<br>BM4125 | **Title:** Performance Management in E-Commerce Companies: A Case Study of JC E-Commerce Retail Company<br>**Presenter:** Lan Luo<br>**Affiliation:** University of Cordilleras, Philippines | |
| 15:15-15:30<br>BM4021 | **Title:** System Dynamics Research on the Development of Rural Product E-commerce<br>**Presenter:** Jianxiang Yu<br>**Affiliation:** Chongqing College of Electronic Engineering, China | |

# TECHNICAL SESSION 3

## Topic: E-Commerce and Supply Chain

| Day 3 \| Sunday \| 14:30-16:15, August 28, 2022 (UTC/GMT+8) | | |
|---|---|---|
| **Room A \|** Link:https://meeting.tencent.com/dm/t2E9E3e3IZCm   **Tencent Meeting ID:**766-3437-6923   **Meeting Password:**202208 | | |
| **Session Chair:** Assoc. Prof. Bambang Leo Handoko, Bina Nusantara University, Indonesia | | |
| 15:30-15:45 BM4030 | **Title:** A Game Study on Players' Responsibility Fulfillment in Three-level Green Supply Chain<br>**Presenter:** Yuxi Hu<br>**Affiliation:** Guilin University of Electronic Technology, China | |
| 15:45-16:00 BM4016 | **Title:** The Impact of Interface Quality, Application Incentives, and Security/Privacy on Shoppers' E-Loyalty: The Mediating Role of Flow<br>**Presenter:** Oviliani Yenty Yuliana<br>**Affiliation:** Petra Christian University, Indonesia | |
| 16:00-16:15 BM4065 | **Title:** Research on the Effect of Blockchain Enabling Finance-Transportation and Warehouse Financing Benefits-Based on System Dynamics<br>**Presenter:** Qin Chuan<br>**Affiliation:** Xiamen University of Technology, China | |

# TECHNICAL SESSION 4

## Topic: Enterprise Technology Innovation and Development

| Day 3 | Sunday | 14:30-16:15, August 28, 2022 (UTC/GMT+8) | | |
|---|---|---|---|---|
| **Room B** | **Link:**https://meeting.tencent.com/dm/wAYiJRARXfTd | **Tencent Meeting ID:**662-7242-8852 | | **Meeting Password:**202208 |
| **Session Chair:** Assoc. Prof. Kholoud Alkayid, University of Wollongong, Australia | | | | |
| 14:30-14:45 BM4119 | **Title:** Research on the Collaborative Innovation Development of the Industry-University-Research of the Biomedical Industry based on SNA and LDA in Fujian Province, China <br> **Presenter:** Jiaxin Guo <br> **Affiliation:** Xiamen University of Technology, China | | | |
| 14:45-15:00 BM4063 | **Title:** The Relationship between Environmental Management System and Firm Performance Based-on Two Opposite Theories <br> **Presenter:** Eliana Justine <br> **Affiliation:** BINUS University, Indonesia | | | |
| 15:00-15:15 BM4014 | **Title:** Institutional Investors and Green Innovation of State-owned Enterprises——Based on the Intermediary Role of Green Agency Costs <br> **Presenter:** Lingxiao Long, and Junqi Yang <br> **Affiliation:** Sichuan University, China | | | |
| 15:15-15:30 BM4051 | **Title:** TS Systematic: Enterprise System for Pasalubong Center in the Philippines <br> **Presenter:** Marlon Diloy <br> **Affiliation:** NU Laguna, Calamba City, Philippines | | | |

# TECHNICAL SESSION 4

## Topic: Enterprise Technology Innovation and Development

| | |
|---|---|
| **Day 3 | Sunday | 14:30-16:15, August 28, 2022 (UTC/GMT+8)** | |
| **Room B |** **Link:**https://meeting.tencent.com/dm/wAYiJRARXfTd    **Tencent Meeting ID:**662-7242-8852    **Meeting Password:**202208 **Session Chair:** Assoc. Prof. Kholoud Alkayid, University of Wollongong, Australia | |
| 15:30-15:45 BM4013 | **Title:** Analysis of the Evaluation and Influencing Factors for Innovation Ability in Sub-provincial Cities Based on the BP Neural Network **Presenter:** Li He **Affiliation:** Xiamen University of Technology, China |
| 15:45-16:00 BM4041 | **Title:** Do Senior Executives with Academic Background Increase the Firm's Inner Pay Gap? **Presenter:** Xiang Liu **Affiliation:** Sichuan University, China |
| 16:00-16:15 BM4049 | **Title:** The Influence of Responsibilities of The Board on CSR Disclosure During The Covid-19 Pandemic **Presenter:** Athalia Dominsky and Ahmad Al-ghifary Nauli Lubis **Affiliation:** BINUS University, Indonesia |

# TECHNICAL SESSION 5
## Topic: E-Commerce and Supply Chain

| Day 3 | Sunday | 16:30-18:15, August 28, 2022 (UTC/GMT+8) | | |
|---|---|---|
| **Room A** | Link:https://meeting.tencent.com/dm/t2E9E3e3IZCm          Tencent Meeting ID:766-3437-6923                            Meeting Password:202208 **Session Chair:** | | |
| 16:30-16:45 BM4053-A | **Title:** A Text Mining Approach to the Analysis of Happiness Issues during the Pandemic Period **Presenter:** Gahye Kim **Affiliation:** Yonsei University, Republic of Korea |
| 16:45-17:00 BM4042 | **Title:** Fraud Analysis on Illegal Online Lending in Indonesia **Presenter:** Jessica Quilianno Ruhulessin **Affiliation:** Bina Nusantara University, Indonesia |
| 17:00-17:15 BM4018 | **Title:** Development of Smart Light Control and Intruder Detection with Voice and Motion Based on Internet of Things using Raspberry Pi **Presenter:** Pattarin Rattanakorn **Affiliation:** Rangsit University, Thailand |
| 17:15-17:30 BM4022 | **Title:** Information Construction of University Labor Union based on "Internet +" **Presenter:** Fang Pei **Affiliation:** Macau University of Science and Technology, China |

# TECHNICAL SESSION 5
## Topic: E-Commerce and Supply Chain

| Day 3 | Sunday | 16:30-18:15, August 28, 2022 (UTC/GMT+8) | | |
|---|---|---|---|---|
| **Room A** \| **Link:**https://meeting.tencent.com/dm/t2E9E3e3IZCm      **Tencent Meeting ID:**766-3437-6923      **Meeting Password:**202208<br>**Session Chair:** | | | | |
| 17:30-17:45<br>BM4054-A | **Title:** A Text Mining Approach to the Analysis of User Experience in the Metaverse Context<br>**Presenter:** Da-Hyeon Jeong<br>**Affiliation:** Yonsei University, Republic of Korea | | | |
| 17:45-18:00<br>BM4064 | **Title:** Volatility Transmission Effect Between Stocks and Exchange Rate Markets in The Selected European Countries<br>**Presenter:** Qing Zhou<br>**Affiliation:** Guangxi University of Finance and Economics, China | | | |
| 18:00-18:15<br>BM4111 | **Title:** The Effect of Gamification on Online Customer Engagement<br>**Presenter:** Tianmin Ma<br>**Affiliation:** Xiamen University of Technology, China | | | |

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# Conceptual Framework for Efficient Inbound Supply Chain Analytics

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*Abstract*— **Industry 4.0 is a terminology that denotes the era of industrial digitization with the emergence of new technologies in which data is the main focus of increasing company competitiveness in all aspects, including supply chain management systems. It has become one of the main focuses of companies to build resilience when dealing with the risk of uncertainties while still meeting the critical goal of improving the efficiency and responsiveness of customer needs. Therefore, supply chain analytics become essential for facilitating data-driven decision-making in planning, sourcing, making, and delivering functions. However, implementing supply chain analytics in developing countries limits only the traditional application silos and ignores disruptive emerging technologies such as cloud computing. This paper explores cases from the manufacturing and retail domains in Indonesia and discusses in detail the conceptual framework for efficient inbound supply chain analytics, which embodies the three characteristics of adequate supply chain visibility such as automation (implementation of automation technology), information (good data management), transformational (analytic application to display information) to meet the organization's need for consolidated reports in all branches/subsidiaries. The aspect of inbound supply chain analytics is specified in the plan and source functions, consisting of eight supplier and inventory key performance indicators through the analytical descriptive data visualization aspect in the Analytics Dashboard.**

*Keywords- analytics dashboards; performance measurement; supply chain visibility; inbound supply chain; cloud computing*

## I. INTRODUCTION

Industry 4.0 is the era of industrial digitization, which includes the emergence of new technologies, where data is the main focus to increase company competitiveness. Data from various sources is collected and processed into information to support the proper strategic decision-making process for the company (data-driven decision making). However, industry 4.0 transformation is more implemented in developed countries and is still lagging in developing countries. It is due to several key challenges, such as the lack of a digital strategy, support from top management, uncertainty about the benefits of investing in technology, and the unpreparedness of the organization to store and process data [1].

The application of technology is one of the main focuses of companies in dealing with the risk of uncertainty (especially during the COVID-19 pandemic). It marks the fourth revolution in supply chain management systems. Technology application can increase company resilience through improved efficiency, responsiveness, flexibility, reliability, transparency, visibility, and traceability of the company [2–4] and still considers the following items: interoperability between technologies, special attention to managerial issues, and the level of technology implementation capability [3, 5–7]. In addition, the means of technology increase the amount of data which could be leveraged for future decision making.

Supply chain analytics refers to a process in the business organization to extract valuable information from a large amount of data associated with supply chain aspects such as procurement, processing, and distribution of goods. Supply chain analytics has evolved from model-driven analysis to data-driven analysis that leverages various approaches such as statistical techniques, business intelligence, and machine learning. The most crucial goal of supply chain analytics is to improve the efficiency and responsiveness of customer needs. However, the abundance of data and various data supplies hinder the effectiveness of supply chain analytics. In addition, traditional application silos (such as enterprise resource planning (ERP), warehouse management, and logistics) are susceptible to developing relevant and interdependency supply chain analytics. Therefore, achieving end-to-end supply chain analytics, which brings information across the supply chain aspects, requires tremendous efforts and scalable technology.

This study aims to propose a conceptual supply chain analytical framework for efficient supply chain analytics. This study emphasizes the inbound supply chain visibility,

which embodies the three characteristics; automation (implementation of automation technology), informational (good data management), and transformational (analytic application to display information) [8]. The proposed analytical framework leverages the cloud-based solutions with four sequential layers; data, data ingestion, data aggregation, and presentation. These four layers are expected to ease the information system management, data integration, and data governance which, in the end, increase the effectiveness of supply chain visibility.

## II. LITERATURE REVIEW

### A. Supply Chain Analytics

Decision making, in general, can be divided into two types, namely: analytical/data-driven decision making and intuitive decision making. Analytical/data-driven decision making is rational decision making based on information analysis to reach a decision. In contrast, intuitive decision making is making decisions that are fast, unconscious, and holistically associated with past and present experience or knowledge. Optimal strategic decision-making combines rationality and intuitiveness [9].

Business analytics is the application of models, methods, and data analysis tools to produce information that helps managers make corporate strategic decisions (data-driven decision making) [10]. The implementation of business data analytics in the supply chain context is referred to as supply chain analytics. There are several types and pillars of analytics currently available, as shown in Table I.

TABLE I.      BUSINESS ANALYTICS TYPES AND PILLARS [10]

| Analytics Type | Definition | Analytics Pillar | Definition |
|---|---|---|---|
| Descriptive Analytics | Analytics aims to discover the main source of the issue, when, where, how often, and how to visualize the data and notify if an issue is emerging. Examples of this type of analytics are drill-down queries or reports, ad hoc or routine reports, dashboards, and visualizations. | Visualization | Visualization is the most suitable for descriptive analytics due to involving visualizing data from several variables, dimensions, correlations, and information. Tools such as business intelligence help with visualization. |
| Predictive Analytics | Analytics aims to predict when events will occur, what trends can be seen, alternatives, and what scenarios emerge. Examples of this type of analytics are forecasting and simulation. | Statistical Modeling | Statistical modeling is more suitable for predictive analytics due to its relation with mathematical modeling and data representation using assumptions and methods such as linear regression. |
| Prescriptive Analytics | Analytics aims to see how to get the best results, how to make decisions in uncertainty, what actions are better to take, and with what impact. Examples of this type of analytics are optimization, decision making under uncertainty, and impact analysis. | Machine Learning | Machine learning is suited for prescriptive analytics due to its relation to mathematical modeling of data and identifying patterns in data to solve a problem. However, unstructured data such as text, audio, and video are better suited to this pillar type. |
| Discovery/ wisdom analytics | Analytics aims to find a new product or service and how to apply knowledge about knowledge (meta- knowledge). | | |

Information visualization enhances human cognition of abstract data through visual graphical representations, making it easier to understand. Visualization in analytics can improve decision-making abilities by providing clear, contextual, and interactive visualizations [9]. This study focuses on the data visualization aspect of analytical description with the features of historical data graphics (variables, dimensions, and measurements).

Analytics capabilities in the context of a supply chain can be distinguished according to the plan, source, make, and deliver functions. Analytics in the planning function relates to analysis data prediction of market demand for products and services to determine capacity and align supply chain operations following market demand and existing resources, thereby providing benefits. Analytics of the sourcing function relates to the consolidation of inbound supply. It focuses on identifying and responding to disruptions related to the procurement process (supplier and market procurement) and providing supplier performance information for the supplier selection and management process. Analytics on the make function includes 1) cost and capacity analysis, 2) production adjustments, 3) identification of material waste, 4) machine failures, and 5) anomalies in the production process. Finally, the analytics function on the delivery function focuses on increasing the efficiency and effectiveness of material flow outbound through delivery to market and customer with the correct time, total, location, and quality. It is said that organizations with limited budgets should implement supply chain analytics with the order of priority from the plan, source, make, and deliver [11]. However, small and Medium Enterprises have limited IT infrastructure and budget. Therefore, it can be concluded that the scope appropriate when implementing supply chain analytics is the plan and source functions (inbound supply chain).

### B. Supply Chain Performance Measurement System

Based on the available literature, the industry subjects that are often discussed are the retail and manufacturing industries. Aligning with the list of retail and manufacturing

industry indicators in the scope of inbound supply chain processes related to the procurement to delivery of goods through suppliers and inbound logistics results. The list of eight key performance indicators (KPIs) consists of four suppliers and four inventory KPIs. A total of eight KPIs were selected based on the research of Brint et al. [12], which states that the number of appropriate KPIs should not be too much or too little as it can confuse (if it is too much) or cause loss of information (if it is too little). Furthermore, the KPIs can be categorized as a leading (a proactive measurement which can predict or influence future performance) or lagging (the result of measurement focuses on historical performance and explains what is currently happening) indicator [13]. Therefore, the list of supplier KPIs for the inbound supply chain is as follows.

- A percentage supplier on time deliveries (leading) is a percentage of orders to supplier fulfilled on the original date and time committed [14–20].
- A supplier lead time (lagging) is the time needed for the supplier to fulfill an order [14–19].
- A percentage of supplier delivery item accuracy (leading) is a percentage of orders to the supplier. All items ordered are the items provided, and no extra items are delivered [15–17, 20].
- A percentage of supplier shipments delivered in good condition (leading) is a percentage of orders to the supplier. Therefore, all items ordered are the items that were delivered in good condition [15, 16, 19].

The list of inventory KPIs for inbound supply chain is as follows.

- A stockout rate (leading) is when items are not available upon the requested need date [14, 16].
- A gross inventory value (lagging) is an average inventory value [14, 15].
- An inventory turnover (leading) is the rate of how many times a company can replace the inventories it has sold in a given period [14].
- An inventory day of supply (leading) is how many days it will take for the stock to run out if sales continue at the same rate as recent sales [15].

## C. Cloud Computing for Supply Chain Analytics

Cloud computing delivers on-demand IT infrastructure and applications to individuals and organizations via an internet platform. In general, there are three service models in cloud computing technology, namely: 1) Software-as-a-Service (SaaS), where the application is located in the service provider's cloud infrastructure and delivered to the user via a web interface or application, 2) Platform-as-a-Service (PaaS), which provides a platform for creating applications through a programming interface and is supported by cloud service providers, and 3) Infrastructure-as-a-Service (IaaS), which provides virtual hardware (storage, server, memory, CPU) that can be leased and run by the user. In service delivery, cloud computing has four types of models, namely: 1) public cloud (IT third parties and cloud services physically own infrastructure resources

are provided to customers, individuals, or organizations via the internet), 2) private cloud (cloud services). They are only intended for a specific organization so that data is under its control, security protocols and organizational system performance. It can be deployed by the organization or used by a third party to help deploy services, 3) community cloud (cloud services for an organization) associations of organizations that have a mission, security needs, and regulatory conditions (e.g., in a company holding group), and 4) hybrid cloud (there are several enterprise applications in public, private, or community clouds) [21]. In this study, the system developed supports the SaaS model, so companies can use the system in public, private, or community clouds as needed.

## III. METHODOLOGY AND THE ANALYTICAL FRAMEWORK

This section aims to discuss the methodology for developing the analytical framework. The study starts with organization needs finding by interviewing stakeholders. The interview results would be the basis for exploring the proper ERP modules for supply chain analytics. Next, this study limits the inbound supply chain by selecting 8 of 150 KPIs from six literatures. Since the supply chain analytics include several pillars, this study attempts to leverage the descriptive analytics instead of doing all the aspects. Subsequently, data is extracted from the database to look for the fundamental descriptive analysis. The extracted data would be the basis for the proposed analytics framework. The flow of the methodology is described in Fig. 1.
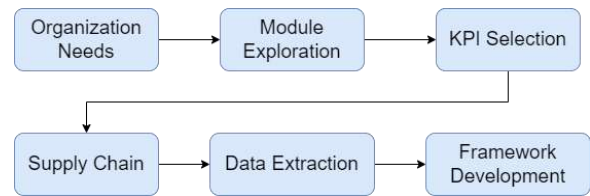


Figure 1. Research Methodology Flow.

After interviewing the stakeholders, it was found that there is an organizational need for consolidation reports based on subsidiary branches or companies. The current reporting in the ERP system could not create consolidation reports with the capability to drill up or down based on the hierarchy of data, warehouses, product categories, suppliers, and subsidiary branches or companies. To manually export the reports based on each branch or subsidiary, stakeholders would need to combine them. Up to this point, there has not yet been any data analytics module developed to visualize each business function's KPIs. There is an increased need for KPI information to help measure their business performance. It helps them evaluate, plan, and make decisions regarding their business in this era of uncertainty. Each of these obstacles is explained in detail in the following sections.

The focus of this study is to complete the current inbound supply chain subsystem with the drill up, drill down, and KPI information. The flow of processes related to the inbound supply chain ERP system consists of purchasing and

fulfilling production plans. Thus, the flow of process observed in the existing system is the purchasing process. The interview and discussion concluded that two companies meet the criteria to observe inbound supply chain processes, namely a wafer biscuit manufacturing company (Company X) and a medical device retail company (Company Y). Therefore, these companies are the basis of the framework development.

## A. A Use Case in Manufacturing Industry

Company X is a wafer-biscuit manufacturer consisting of the main factory, several warehouses near the main factory, and several distribution centers spread across the nation. In general, there are five types of items in the purchasing process, which are: raw materials and packing, machine or transportation spare parts, office and household stationery, maintenance services, non-stock costs (such as shuttle fees and employee meals) and finished good expedition services for distribution across the seas. The purchasing process is illustrated in Fig. 2.
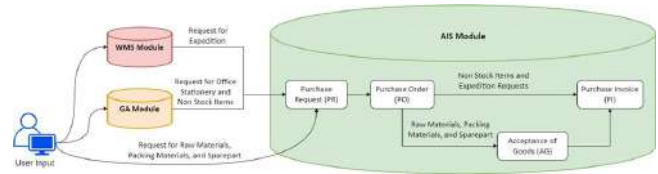


Figure 2. General Purchasing Process in Assessed Manufacturing Company.

The purchasing process, in general, consists of four major processes, which are: user's purchase request (PR), creation of purchase order (PO), creation of acceptance of goods (AG), and the creation of purchase invoice (PI). For non-stock items, there are two purchasing process flows, which are: through the creation of PR, PO, and PI or through PI only. Based on the data inputted into the system, there are several reports related to the purchasing process used frequently in the company, which are described in Table II.

TABLE II. REPORTS FREQUENTLY USED IN THE COMPANY

| Report Name | Description | Stakeholder |
|---|---|---|
| List of suppliers | Consists of how many new suppliers in a month | PPIC staff whose tasks are related to production planning and supplier selection |
| Supplier performance rating | Based on each supplier's capability in completing POs, lead time, item outstanding, product received in good condition, price competitiveness | PPIC staff helps to evaluate the quality of each supplier |
| Outstanding PR, PO, AG, and PI report | Shows the number of PRs. POs, AGs, and PIs which are unfinished | Top management (as approver) and staff admin (who inputs the data) |
| Vendor Performance for each PO | Percentage of orders to the supplier in which all items ordered are the items arrived in good condition | PPIC staff |
| PO Approval Information | Shows PO approval lead time | PPIC and top management (as approver) |

## B. A Use Case in Retail Industry

Company Y is a medical device retail company with one main supplier and several small secondary suppliers. Company Y has a total of 13 branches which provide online (e-commerce) and offline sales. The goods distribution process from the main supplier to each branch is illustrated in Fig. 3.
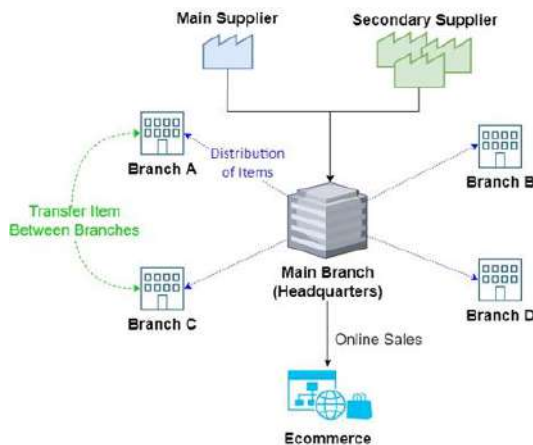


Figure 3. General Distribution Process from Suppliers to Each Branches in Assessed Retail Company.

The main and secondary suppliers distribute the goods to the main branch, which then will be redistributed to each branch. Goods obtained from secondary suppliers are for products which need to be assembled first in the main branch. An example of these types of products is first aid kits which consist of bandages, antiseptics, and plaster stock that are repackaged and sold together. After the assembly process in the main branch is finished, the company will distribute the goods to the other branches.

Item transfer requests are also available to transfer goods from one branch to another. For example, this feature is used when Branch A has items out of stock, and it can request item transfers from Branch B. As the company has two sales platforms, online and offline, the company acquires a third party omnichannel application solution to help consolidate the stock level information between the online and offline stock.

As the goods are distributed from the main branch, the procurement process begins with accepting goods from each branch, as illustrated in Fig. 4. The main branch manages the distribution process based on the stock levels reports on each branch. First, the main branch will distribute the goods to each branch. Each branch will then check and input the acceptance of goods (AG) based on the delivery note. The stock level information will then be updated. After the goods are accepted, and the invoice has been released, the purchase

invoice is made based on the delivery note, acceptance of goods, and supplier invoice.
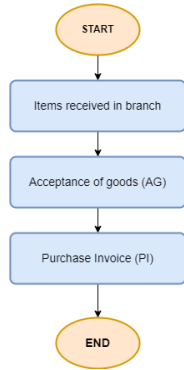


Figure 4.   General Purchasing Process in in Assessed Retail Company.

When the main branch checks the stock level status, the staff admin or company owner needs to access the stock report for each branch and consolidate each branch's report into one report consolidation. The consolidation report will then help staff admins and owners to determine the level of product requests in each branch which is crucial for the procurement process. Based on the study case, it can be concluded that there are two main issues which these two companies encounter:

- Difficulties in obtaining a consolidation report across all branches or subsidiaries companies. The state of the COVID-19 pandemic has resulted in fluctuating demand and stock levels of each branch or subsidiary due to very high uncertainty.
- Reports are displayed in the form of tables and lists, thus making it difficult for users to retrieve helpful information which accommodates the company's strategic and operational needs. Users put in extra effort to process the reports manually and produce the needed information. In other words, the visibility of the inbound supply chain is less efficient.

## IV.   CONCEPTUAL FRAMEWORK FOR INBOUND SUPPLY CHAIN ANALYTICS

The system development process begins with the creation of a conceptual framework. In this section, a solution is analyzed academically, and its implementation based on the use case of the manufacturer and retail industry to produce the proposed conceptual framework [22, 23].

The proposed architecture of the conceptual framework in general consists of four layers such as data layer, data ingestion layer, data aggregation layer, and presentation layer, which is illustrated in Fig. 5. These four layers support data integration, data governance, and system management.

### A.   Data Layer

The first layer is a data layer which consists of large databases from various daily operational business process functions. This data is the source for information processing to support managers' data-driven decision-making. Database components needed to transform operational data into

analytical data are Data Definition Language (DDL or metadata) and data. Inbound supply chain processes are related to production planning and sourcing processes, of which the three modules related to these processes are Accounting Information System (AIS), General Affair Management System (GAMS), and Warehouse Management System (WMS). Three of these sub-systems provide data related to procurement planning and inventory management. Data from the AIS module is heavily associated with raw or finished goods stock data, affecting the company's procurement planning and production processes. Data from the GAMS module is needed for non-stock procurements, such as services or office equipment. Data from the WMS module is required for expedition service procurement to distribute finished goods to the company's distribution centers or branches. Last but not least, data from GAMS and WMS is also used in the AIS module to provide data related to the procurement or acceptance of raw or packing materials from warehouses.
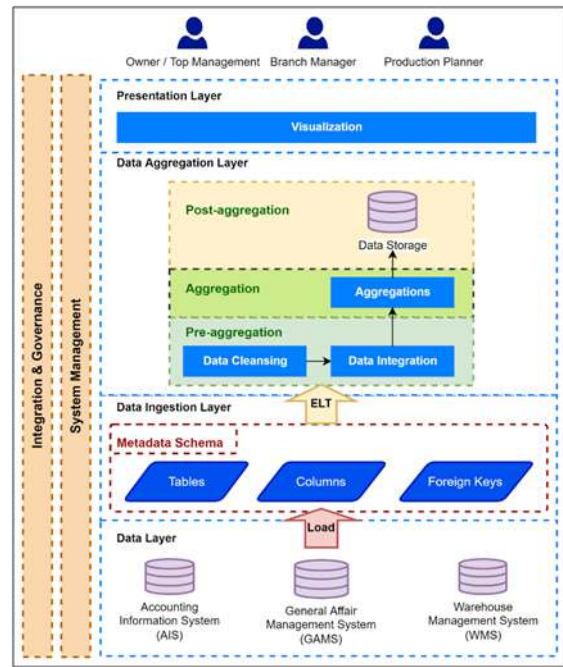


Figure 5.   The Conceptual Framework for Inbound Supply Chain Analytics.

### B.   Data Ingestion Layer

The second layer is the Data Ingestion Layer. This layer consists of a database schema or metadata extraction process to select the needed tables and columns extracted for the data aggregation process. Metadata schema extracted includes the list of tables, columns, and foreign keys in the database. After the metadata schema has been successfully extracted and used to select the tables and columns to be extracted, the process proceeds to the Extract, Load, and Transform (ELT) to be propagated onto the next layer. The system automatically does the ELT process as the configured interval schedule.

## C. Data Aggregation Layer

The third layer is the Data Aggregation Layer, which consists of pre-aggregation, aggregation, and post-aggregation stages. The pre-aggregation stage consists of two processes: data cleansing and data integration. The data cleansing process identifies and cleanses the invalid and irrelevant raw data. The data integration process standardizes the formats and structures of raw data, which was sourced from multiple systems, and has been through the data cleansing process and stored in the staging area.

The next step is the aggregation stage which aggregates the data using an aggregate function or calculation against raw data to generate the KPI information listed in the previous section. After all KPI calculations have finished, the next step is post-aggregation. In this step, the KPI calculation results are stored in the data storage, which is a data warehouse.

## D. Presentation Layer

The last layer is the presentation layer which consists of visualization tools to visualize KPI information for analysis. The visualization tool used is in the form of a web-based dashboard directly accessible by users, which shows the combination of various KPIs from multiple systems in the data layer. For example, in the inbound supply chain scope, the target user who uses the KPI information for decision-making includes the owner, top management, branch manager, and production planner. An owner or top management can view the (drill-up) consolidated branches/subsidiaries or (drill-down) certain branches/subsidiaries' inbound supply chain KPI to help in determining the company's strategy. The inbound KPI supply chain can also be drilled up and down based on the date by a user, warehouse, supplier, and product category.

## V. Conclusion

This study proposed a conceptual framework design for efficient inbound supply chain analytics. The result of this study focused on the organization's need for a consolidation report across subsidiaries and branches/companies through supply chain analytics. There are four layers in the conceptual framework: data layer, data ingestion layer, data aggregation layer, and presentation layer. These four layers work together to support data integration, data governance, and system management. For example, the data aggregation layer consists of three sublayers: pre-aggregation, aggregation, and post-aggregation. Although the preliminary feedback from the stakeholders confirms the suitability of the proposed conceptual framework, the future work should involve the activities related to the assessment of the system design, the system prototype development, and the evaluation of the system as a whole by conducting field studies.

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