

CONFERENCE PROGRAM

ICITM 2023

12th

International Conference on Industrial Technology and Management












Cambridge, United Kingdom

February 16-18, 2023

Published by



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WELCOME MESSAGE

On behalf of Conference Committees, we welcome you to attend the 12TH International Conference on Industrial Technology and Management held in Cambridge, United Kingdom on the February 16-18, 2023. ICITM has been an annual event which was held in many places. We would like to extend our grateful thanks to all the participants. The ICITM 2023 Conference will build on the success of the previous conferences.

The conference aims to provide an interactive communication platform for practitioners to learn about the most cutting-edge academic and industrial application trends, to share the latest scientific research and technological achievements, innovative ideas and scientific methods in the field of industrial technology and management, to improve the level of academic research and industrial application in the field of Industrial technology and management so as to serve the global strategic deployment of new and old kinetic energy conversion, and promotes technology research, development, and application home and abroad.

We feel deeply grateful to all that have contributed to make this event possible: authors who contributed papers, the conference steering committee, the conference speakers, and the peer reviewers. Thanks are also extended to the conference administrative committee and the supporters for their tireless efforts throughout the course of the conference.

We hope that all participants and other interested readers benefit from and enjoy the presentations and proceedings and also find ICITM 2023 stimulating in this process.

Conference Organizing Committees



Prof. Kim Hua Tan

Nottingham University Business School, UK

BIO: Dr. Kim Hua Tan is a Professor in Operations and Innovation Management. Currently, he is also the Associate Dean for Research and Knowledge Exchange at the business school. Prior to this, he was a Researcher and Teaching Assistant at Centre for Strategy and Performance, University of Cambridge. Professor Tan spent many years in industry, before joining academia in 1999. His current research interests are transformative innovation, lean management, operations strategy, big data and data analytics, and supply chain resilience. He has spoken on these subjects across the globe, including China, Indonesia, Japan, Vietnam, Thailand, Malaysia, Latin America, Europe, and other locales. He has been the Principal Investigator for various grants from EPSRC, ESRC, DTI, UK Royal Society, Japan Society for the Promotion of Science (JSPS), EU-TEMPUS, Daiwa Anglo-Japanese Foundation, Emerald Research Fund, etc. Professor Tan has published a book called 'Winning Decisions: Translating Business Strategy into Action Plans,' and more than 150 articles in leading academic journals such as Decision Sciences, European Journal of Operation Research, Decision Support Systems, International Journal of Operations and Production Management, International Journal of Production Economics, International Journal of Innovation Management, and many others.

(Onsite Talk) Speech Title: Blockchain Adoption for Pepper Smallholder Farmers and Buyers

Abstract: This project was inspired by a wave of interceptions of horticultural produce from Uganda during plant health checks in the EU for non-compliances (excessive pesticide residues and the presence of harmful organisms). The project started well with the involvement of the Ugandan Ministry of Agriculture (MAAIF) with whom we held a series of online workshops to map out the Fresh Fruit and Vegetable Export Supply Chain, and to identify pain points in terms of governance and information shortages. While we set out to investigate opportunities for blockchain integration in the value chain for enhanced transparency and compliance, it was understood that scanty data and low levels of literacy in the supply chain were in part to account for the rising wave of interceptions. This project offers insights to the opportunities and challenges of blockchain adoption and application in food supply chains, capabilities required for the adoption of blockchain technology in Agriculture as well as how good practice can be disseminated across the supply chain.



Dr Nick Chung

The Hong Kong Polytechnic University, China

BIO: Dr Sai-Ho Chung (Nick) graduated with a BEng(Hon) in Industrial, Manufacturing and Systems Engineering from The University of Hong Kong in 2001. He obtained his MPhil and PhD from there in 2004 and 2007 respectively. He joined in the Department of Industrial and Systems Engineering, The Hong Kong Polytechnic University, as a Lecturer in 2007 and was gradually promoted to Associate Professor in 2019. He joined as the Associate Director of the Integrated Graduate Development Scheme Unit since 2018.

His research interests include logistics and supply chain management, supply chain collaboration, supply chain finance, production scheduling, distribution network, vehicle routing, container terminal operations, airline crew scheduling, aircraft maintenance routing, flight fuel consumption estimation, etc. Dr Chung has been the principal investigator of about 10 research projects and published over 80 international journal papers, including IEEE Transactions on Industrial Electronics, IEEE Transactions on Systems, Man, and Cybernetics, IEEE Transactions on Systems Journal, OMEGA, Decision Support Systems, Decision Sciences, International Journal of Production Economics, International Journal of Production Research, Computers & Operations Research, Robotics and Computer Integrated Manufacturing, Resources, Conservation & Recycling, Transportation Research Part E, Transportation Research Part B, Risk Analysis,

(Online Talk) Speech Title: Data Analytics in Airlines: From Aircraft Fuel Consumption to Flight Delay and Operations

Abstract: Because of the maturity of technologies, nowadays, the performances of aircraft during flights can be measured and recorded. With the availability of the data, a lot of research work can be conducted. In practice, estimation of fuel consumption for a flight trip is usually done by engineering approaches, which mainly consider physical factors, e.g., aircraft age/condition, engine, planned weight/cruise level, etc. However, the actual performance of flights still usually deviates from the estimation due to other uncontrollable factors, e.g., weather, wind direction, etc. Thus, we conducted an analysis of the flight data and proposed a constructive neural network for fuel consumption estimation. The results indicated that the prediction accuracy increased with the consideration of uncontrollable factors. Moreover, various reasons causing deviation were found. Among the reasons, interestingly, we found that flying time was shown to be related to the flight departure delay. Applying this characteristic to airline cabin crew scheduling, schedule reliability obtained was further enhanced.



FH. Prof. Dr. DI Mag. Bernhard Heiden, MBA
Professor of Production Engineering
Carinthia University of Applied Sciences (CUAS)
9524 Villach, Europastraße 4, Austria

BIO: Bernhard Heiden is a professor of production technology in the industrial engineering degree program at the Carinthia University of Applied Sciences. He previously worked in the industry for six years. He completed his process engineering studies at TU Graz, writing his diploma thesis at ETH Zurich. He holds a doctorate in mechanical engineering from the Graz University of Technology. He was a university assistant at the Institute of Thermodynamics and Combustion Engines for four years and a student assistant at the Institute of Fluid Mechanics and Heat Transfer for the same period. At the Karl-Franzens University of Graz, he holds a degree in Philosophy and an MBA in Financial Management and Controlling. His current research and consulting focus is on production technology and Industry 4.0. He is co-founder and part of an Austria-wide cooperation network for 3D printing and chairman of the 3D printing group at FH-Kärnten, and part of the iMaterial research group initiated in 2018, which focuses, among other things, on research into smart materials and their manufacturing processes. Examples of project implementations were (*) processing an innovation cheque to evaluate a CNC-controlled production cutting process for industry or the FFG research project "Polygenferos 4.0", which focused on the industrial training of companies in the field of additive manufacturing. (**) An interdisciplinary project for cooperating robots with the Alpen Adria University Klagenfurt as a project partner. (***) An EU 3D printing project to develop a fiber composite 3D printer (MMO3D) and many others. He is the initiator and co-founder of Smartlab Carinthia at the University of Applied Sciences Carinthia, the first Fab Lab in Carinthia, as well as a lecturer and author of numerous articles and technical papers, as well as an editor of the book "Mit Innovationsmanagement zu Industrie 4.0" published by Springer Verlag in 2018.

(Onsite Talk) Speech Title: First Elements of Production Portfolio Theory: A New Industrial Engineering Scientific Method

Abstract: In this paper, we give for the first time a general approach for implementing risk in production, adapted from economic Portfolio Theory, in a new theory, which we will then refer to as Production Portfolio Theory and use it with basic illustrative examples of the non-mathematical type. By this, we can measure risk, optimise it concerning production goals, and compare it with extrinsic optimisation. A follow-up work shall give then mathematical applications.



Assoc. Prof. Alexander Yu Obydenov

Financial University under the Government of the Russian Federation, Russia

BIO: Alexander Yu. Obydenov is an Associate Professor at Financial University under the Government of the Russian Federation and Lomonosov Moscow State University, Leading Expert at the Center for Cultural Strategies and Project Management, Moscow, Russia. He has more than 20 years of experience in analytics and academics. His research work is mainly dedicated to agile methods of strategic management, governed self-organization, complexity theory and business agility. He has published above 70 papers and articles, most of which are highly rated publications. He appears at international conferences as a speaker and organizer at a regular basis.

(Online Talk) Speech Title: Business Agility as a modern company's key to success

Abstract: Empirical studies conducted by different researches show that currently, companies that apply business agility demonstrate a stronger competitive position and financial performance. As of today, we can already conclude that agility is being implemented more in various aspects and on various levels within companies. Our concept of «governed self-organization», which correlates with another known concept of «guided self-organization», is fully backed and supported by these conclusions, drawn from modern business practice. In the following presentation we will elaborate on the arrangement of an organization with business agility properties within the framework of our concept. Such organization uses appropriate agile strategies on both independent business and corporate level, has relevant organizational structure and culture, and customized business processes. That enables companies to use human resources more productively, create new products and enter new markets more efficiently, build strategically sustainable competitive advantages and achieve a more successful corporate development overall. And of course, aspects of business agility prove to be of high significance for modern industrial technologies.



Prof. Risty Acerado

Technological Institute of the Philippines, Philippines

BIO: Risty Acerado is a faculty member of the Information Systems Department of the Technological Institute of the Philippines, Quezon City. She has been in the academe for 14 years. She's a graduate of Bachelor of Science in Computer Science (BSCS), has a Master's degree in Information Management (MIM), and earned her Doctor in Information Technology (DIT) last 2019. She served as one of the organizers of the 2020 Cybersecurity Conference organized by ISSA PH and UNFPA; She was also an IT consultant for a UNFPA project related to cyber trafficking; She also served as an adviser to several groups of students who worked on the knowledge channel project in developing a mobile learning application. She presented several research papers at international conferences both locally and internationally. Her researches focus on m/e-learning applications and predictive and data analytics. Some of her papers were published in IEEE and ACM digital libraries. She also served as a peer reviewer in International Conferences held in the United Kingdom and Thailand (International Conference on Software Engineering and Information Management - ICSIM and International Conference Industrial Technology and Management - ICITM) and the Asian Journal of Mathematics and Computer Research.

(Online Talk) Speech Title: CMATA: Cyber Trafficking Monitoring and Tracking Prototype

Abstract: With the evolution of the Internet, trafficking has broader and borderless operations targeting virtual spaces where individuals of different ages can be subjected to cyber trafficking. Despite the government's efforts to combat cyber trafficking, the growing number of cases is alarming. One apparent reason is that traffickers keep advancing their technical strategies, so it becomes more challenging for law enforcement to investigate complex and transnational organized crime. Thus, this paper presents the development of a cyber monitoring and trafficking web application integrated with a web scraper that identifies websites with a high probability of being used in cyber trafficking activities. The web scraper was written using Beautiful Soup. With the result of the sensitivity analysis conducted in the study, beautiful soup was determined to be the most suitable tool for developing web scraping algorithms based on performance, portability, and accuracy compared with the Scrapy and Selenium tools. Upon the initial testing of the developed prototyped in tracking and monitoring suspected cyber traffickers, it was able to scrape 45 potential trafficking websites. This kind of application with a visualization dashboard can help law enforcement officers identify, track, and monitor online traffickers easily and quickly.



Dr. Radu Godina

NOVA University Lisbon, Portugal

BIO: Radu Godina is currently an Assistant Professor at the NOVA School of Science and Technology, FCT NOVA, NOVA UNIVERSITY LISBON. He received the Ph.D. degree from University of Beira Interior (UBI), Covilhã, Portugal. He has authored or co-authored more than 160 indexed international journals, book chapters and conference proceedings papers in such topics as industrial symbiosis, sustainability, lean manufacturing, electric vehicles, circular economy, life cycle assessment and quality control. He has published with 22 international universities and 10 distinct enterprises and/or corporations. He is a full member of the EurOMA ociation (European Operations Management Association) and full member of the IEOM Society International Association (Industrial Engineering and Operations Management Society - IEOM). He recently is developing research in the project Microstructural Engineering and Integrated Non-Destructive Testing - Smart-WAAM obtained through European Institute of Innovation & Technology (EIT) RawMaterials, and in this task the goal is to detail rigorously and perform the life cycle analysis, life cycle cost and social life cycle analysis of the additive manufacturing process, namely Wire Arc Additive Manufacturing (WAAM).

(Onsite Talk) Speech Title: Life Cycle Assessment of Additive Manufacturing Processes

Abstract: Additive manufacturing (AM) processes are increasingly being subjected to Life Cycle Assessments (LCA) due to increased awareness and stricter emissions controls. In spite of the fact that AM has some advantages, such as low material waste, its environmental impacts must be assessed using a comprehensive method, such as Life Cycle Assessment. It is also important to assess the economic viability of AM processes before they are adopted, otherwise, such processes will be deemed as a curious novelty only. An economic assessment of AM processes and existing LCA studies are, therefore, addressed. A comparison is also made between AM processes and traditional manufacturing technologies. Last but not least, AM is discussed in relation to CM processes and vice versa with respect to the environmental and economic benefits. With this knowledge, AM practitioners will be able to select more efficient and environmentally friendly manufacturing processes for their products, on a case by case basis.

Meeting Room Information

Password for all: 021618

ZOOM Download Link:

<https://zoom.us/client/latest/ZoomInstaller.exe>

https://www.zoomus.cn/cncluster/download_win.htm (China version)

Date	Arrangement	ZOOM Link
February 16, 2023	Pretest for Committee & Speakers	https://us02web.zoom.us/j/81265045133
	Pretest for Authors	https://us02web.zoom.us/j/86532625469
February 17, 2023	Opening Ceremony & Speeches	https://us02web.zoom.us/j/81265045133
February 18, 2023	Online Sessions 1 & 3	https://us02web.zoom.us/j/81265045133
	Online Sessions 2 & 4	https://us02web.zoom.us/j/86532625469

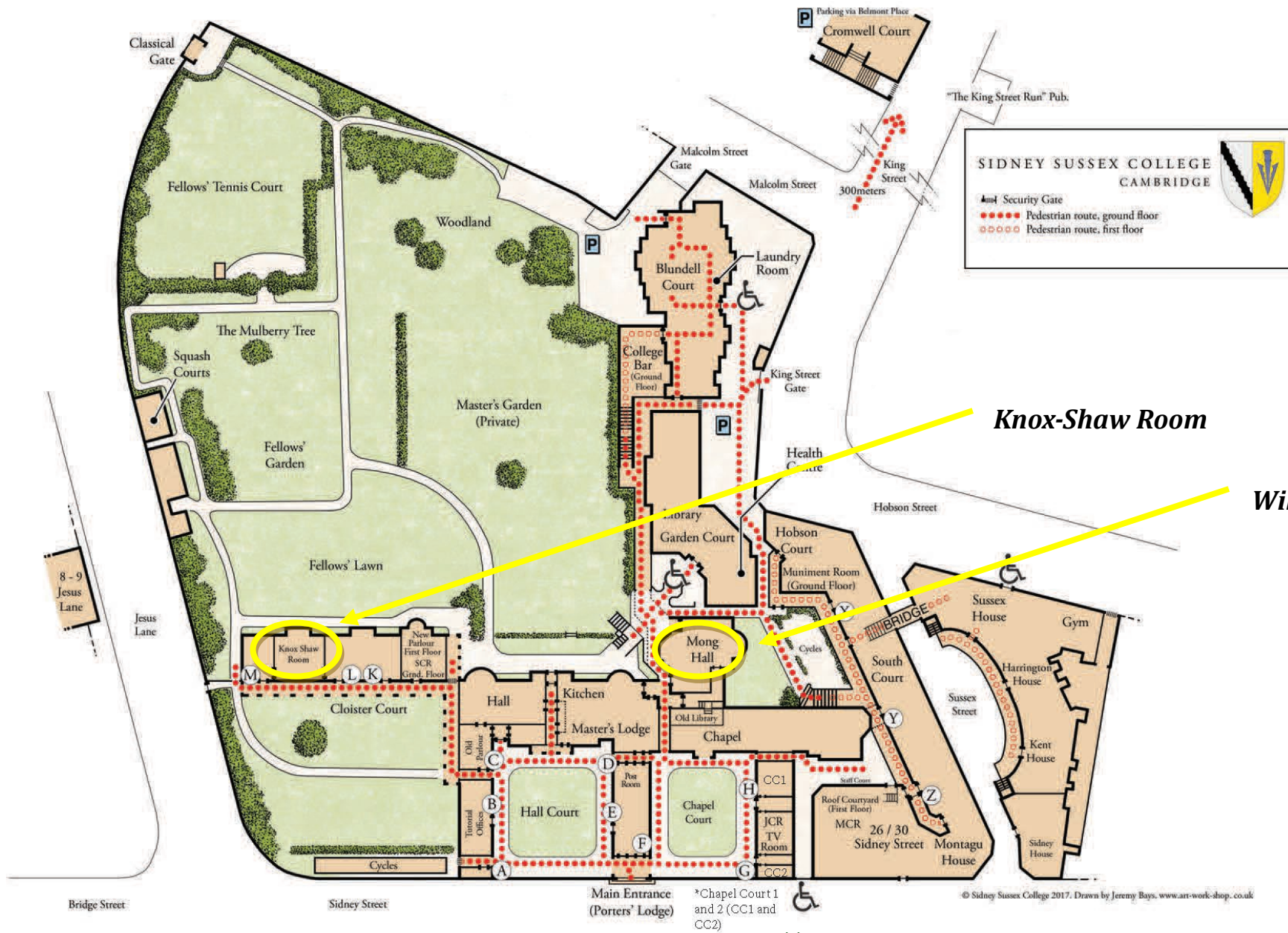
Presentation Tips

- ✚ Enter the room 10-15 minutes in advance.
- ✚ Prepare the PPT file of your presentation on your laptop in advance.
- ✚ **Duration of each Presentation:** about **12 Minutes of Presentation** and **3 Minutes of Q&A**.
- ✚ **Questions:** During the conference, if you have any question, please contact “Assistant” privately, you’ll get assisted immediately.
- ✚ **Duration of Oral Presentation:** 15 Minutes of Presentation including Q&A.
- ✚ **Dress Code:** All participants are required to dress formally. Casual wear is unacceptable. National formal dress is acceptable.
- ✚ **Note:** The regular oral presentation time arrangement is for reference only. In case any absence or some presentations are less than 15 minutes, please join your session before it starts.

College Map

You can download it

here: [College map](#)



February 16-18, Daily

February 16, 2023 | GMT+0, London Time Online Attendance Pretest Password for all: 021618

Pretest for Online Speakers and Committee		Zoom Link: https://us02web.zoom.us/j/81265045133
09:00-12:00	Pretest for Speakers (Breakout Room)	
	Pretest for Committee	
Pretest for Online Authors		Zoom Link: https://us02web.zoom.us/j/86532625469
09:00-10:00	V112 V230 V236 V252 V380 V404 V408 V406	
	V102 V109 V116 V224 V229 V361 V382 V411 V409 V384	
10:00-11:00	V105 V243 V364 V258 V373 V375 V254 V379 V388 V393 V394	
	V391 V259 V374 V101 V111-A V376 V400 V413 V415 V387 V392 V223	

February 17, 2023 | GMT+0, London Time

Location: [William Mong Hall, the Mong Building](#)

Meeting Link: <https://us02web.zoom.us/j/81265045133> (Meeting ID: 812 6504 5133) Password: 021618

08:00-09:00 Onsite Sign-in

Host: **Prof. Ezendu Ariwa**, University of Wales Trinity Saint David, UK

09:00-09:05 Welcome Message
Prof. Ezendu Ariwa, University of Wales Trinity Saint David, UK

09:05-09:10 Opening Remarks
Prof. Luigi Maria Galantucci, Polytechnic University of Bari, Italy

09:10-09:55 Keynote Speech I
Prof. Kim Hua Tan, Nottingham University Business School, UK
(Onsite Talk) Speech Title: **Blockchain Adoption for Pepper Smallholder Farmers and Buyers**

09:55-10:40 Keynote Speech II
Dr Nick Chung, The Hong Kong Polytechnic University, China
(Online Talk) Speech Title: **Data Analytics in Airlines: From Aircraft Fuel Consumption to Flight Delay and Operations**

10:40-11:00 Break Time & Group Photo

11:00-11:20 Invited Speech I
FH-Prof. Mag. DI Dr. Bernhard Heiden, Carinthia University of Applied Sciences, Austria
(Onsite Talk) Speech Title: **First Elements of Production Portfolio Theory: A New Industrial Engineering Scientific Method**

11:20-11:40- Invited Speech II
Dr. Radu Godina, NOVA University Lisbon, Portugal
(Onsite Talk) Speech Title: **Life Cycle Assessment of Additive Manufacturing Processes**

11:40-12:00	<p>Invited Speech III Assoc. Prof. Alexander Yu Obydenov, Financial University under the Government of the Russian Federation, Russia (Online Talk) Speech Title: Business Agility as A Modern Company's Key to Success</p>
12:00-14:00	Lunch Time
14:00-16:00 William Mong Hall	<p>ONSITE SESSION 1 Product Production and Equipment Management Session Chair: Prof. Luigi Maria Galantucci, Polytechnic University of Bari, Italy</p> <p>V103-A V108 V240 V245 V249 V383 V110 V363-A</p>
14:00-16:30 Knox-Shaw Room	<p>ONSITE SESSION 2 Logistics Warehousing & Enterprise Management Session Chair: FH-Prof. Mag. DI Dr. Bernhard Heiden, Carinthia University of Applied Sciences, Austria</p> <p>V114-A V231-A V115 V226 V117 V234 V235 V250 V365 V398</p>
18:00-20:00	<p>Dinner</p> <p>Address: Graduate Cambridge Granta Place, Mill Ln, Cambridge CB2 1RT</p> <p>Noted: The dining room will be closed at 20:00pm.</p>

February 18, 2023 | GMT+0, London Time **Password: 021618**

09:30-11:50	<p>ONLINE SESSION 1 Network Design and Application in Industrial Systems Session Chair: Prof. Risty Acerado, Technological Institute of the Philippines, Philippines Invited Speech V112 V230 V236 V252 V380 V404 V408 V406</p> <p>Meeting Link: https://us02web.zoom.us/j/81265045133</p>
09:30-12:00	<p>ONLINE SESSION 2 AI-based Information Management and System Analysis Session Chair: Dr. Frida Betto, University of Padua, Italy V102 V109 V116 V224 V229 V361 V382 V411 V409 V384</p> <p>Meeting Link: https://us02web.zoom.us/j/86532625469</p>
12:00-14:00	Break Time
14:00-16:45	<p>ONLINE SESSION 3 Lean Manufacturing and Management Model Session Chair: V105 V243 V364 V258 V373 V375 V254 V379 V388 V393 V394</p> <p>Meeting Link: https://us02web.zoom.us/j/81265045133</p>
14:00-17:00	<p>ONLINE SESSION 4 Production System Monitoring and Management Standards Session Chair: Prof. Emmanuel Fragnière, HES-SO, Switzerland V391 V259 V374 V101 V111-A V376 V400 V413 V415 V387 V392 V223</p> <p>Meeting Link: https://us02web.zoom.us/j/86532625469</p>

ONSITE SESSION 1

February 17, 2023 | GMT+0, London Time **14:00-16:00**

Product Production and Equipment Management

Session Chair: Prof. Luigi Maria Galantucci, Polytechnic University of Bari, Italy

V103-A V108 V240 V245 V249 V383 V110 V363-A

Location: William Mong Hall

<p>V103-A 14:00-14:15</p>	<p>Leveling of the speed control path in swivel axes of machining centers by means of Finite Element Analysis Gerhard Kehl Presenter(s): Gerhard Kehl, University of Applied Sciences Esslingen</p> <p>Abstract: The speed control path of swivel axes in machining centers varies with the mass moment of inertia of the load, but also with the swivel angle itself. This is highly undesirable, since a varying speed control path endangers the robustness of the control and makes control parameterization during implementation more complicated. Using finite element analysis in the field of industrial simulation, it was determined on a machining center that differences in the vertical and the horizontal compliance frequency responses at the radial bearings are the cause of the dependence on the swivel angle. In order to homogenize the speed control path, the bearing blocks were integrated in the machine frame by design. This means that henceforth only a reduced number of band-stop filters are required for speed setpoints, which saves costs during implementation and leads to higher machine productivity.</p>
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<p>V108 14:15-14:30</p>	<p>Optimisation of Bioethanol Production from Oil Palm Trunk Sap Jolius Gimbun, Nor Shahirah Mohd Nasir, Sumaiya Zainal Abidin, Chin Kui Cheng and Maizirwan Mel Presenter(s): Jolius Gimbun, Centre for Research in Advanced Fluid and Processes, Universiti Malaysia Pahang, Malaysia</p> <p>Abstract: This paper presents an optimization of bioethanol production from oil palm trunk sap (OPTS) fermentation. The OPTS was obtained from an old palm tree (30 years old), whereas ethanol fermentation was carried out using <i>Saccharomyces cerevisiae</i>. The sugar content in OPTS and fermentation mother liquor was determined using high-performance liquid chromatography (HPLC). The parameters such as initial pH, temperature, and agitation rate were optimised using response surface methodology (RSM) with rotatable central composite design (CCD). It was found that the highest yield of bioethanol (75.82%) was obtained at the initial pH (5.79), temperature (31.05 °C), and agitation rate (164.38 rpm). The optimization model of OPTS fermentation to bioethanol developed in this work may provide useful guidance to obtain a high ethanol yield from OPTS.</p>
<p>V240 14:30-14:45</p>	<p>Solving the Storage Location Assignment Problem using Reinforcement Learning Arne Troch, Erik Mannens and Siegfried Mercelis Presenter(s): Arne Troch, University of Antwerp - imec - IDLab, Belgium</p> <p>Abstract: In this work, we deal with the Storage Location Assignment Problem, often referred to as the SLAP, in an E-commerce Distribution Center (EDC). With E-commerce steadily increasing in popularity over the past decades, it has become a key part of the logistics industry. Due to the direct link with the customer, EDC' s are forced into a significantly more complex and dynamic order picking process compared to conventional Bulk Distribution Centers. As a result of these challenges, many traditional approaches such as genetic algorithms and rule-based methods reach only suboptimal solutions. We propose the use of Reinforcement Learning (RL) to solve the SLAP, leading to a solution that adapts to dynamically changing environment parameters during runtime. For this purpose, we define a model that transforms the SLAP into a sequential decision making problem. We validate this novel approach by training a state-of-the-art RL algorithm within this model and comparing its results with a benchmark genetic algorithm approach. We conclude that the RL algorithm achieves promising results, surpassing benchmark performance and nearing optimal performance in a small-scale warehouse environment.</p>
<p>V245 14:45-15:00</p>	<p>Computation of minimum number of Automated Guided Vehicles (AGVs) with Battery Charging Haafizah Rameeza Shaukat, Bruce Gunn, Michael Johnstone and Douglas Creighton Presenter(s): HAAFIZAH RAMEEZA SHAUKAT, Deakin University, Australia</p> <p>Abstract: The research contributes to the study of the automated guided vehicle (AGV) utilisation, specifically the number of AGVs involved with different industrial time intervals. Computation of the number of AGVs depends upon the assigned tasks of different time intervals such as loaded and unloaded travel times, loading and unloading times, return travel, and the completion period.</p>

	<p>There has been an effort to manage the current research gap in existing studies and help the industry sector to estimate the minimum number of AGVs. Modernisation left an impact on the industry too; this research offers additional knowledge toward the manufacturing sector, particularly how automated guided vehicles can easily deployed with minimum effort, as they are flexible and easily can move on a variety on paths. This research study describes an algorithm for AGV formulation based on the transport time factors, to perform different jobs in any industry. The current COVID pandemic also highlights the importance of robots and digitalisation to compete with such disasters, little effort has been devoted to computing with agent-based simulation, to compare the finding with calculated values. We address the difficulties and demonstrate how many AGVs are required to meet the industry requirement.</p>
<p>V249 15:00-15:15</p>	<p>Production planning and scheduling challenges in the engineer-to-order manufacturing segment - A literature study Ninan Theradapuzha Mathew and Björn Johansson Presenter(s): Ninan Theradapuzha Mathew, Chalmers University of Technology, Sweden</p> <p>Abstract: Production planning and scheduling is a significant activity for manufacturing companies that follow an engineer-to-order (ETO) manufacturing strategy. The volatile nature of customer demands and the primary requirement to produce highly customized products generate numerous challenges that affect the efficiency of planning and scheduling operations in engineer-to-order manufacturing. The article presents a literature study to identify the main challenges in production planning and scheduling in engineer-to-order manufacturing. The article also provides a classification of the identified challenges into four different categories. The categorization of challenges strongly suggests replanning or rescheduling as a critical requirement in the engineer-to-order manufacturing segment to attain resilience in uncertain environments.</p>
<p>V383 15:15-15:30</p>	<p>Digital Twin in complex operations environments: potential applications and research challenges Raziyeh Ghanbarifard; António Henrique Almeida; Américo Azevedo Presenter(s): António Henrique Mendes de Almeida, INESC TEC, Portugal</p> <p>Abstract: This paper aims to thoroughly discuss the use of Digital Twin technology in complex operations environments, highlighting its potential applications and the research challenges that need to be addressed. This is necessitated by the fact that currently there is no comprehensive literature review and framework for implementing Digital Twin technology in complex operations environments. Furthermore, existing interpretations of DT implementation are inadequately detailed and not very informative in this area. This may be a consequence of the difficulties of collecting and extracting useful information from data in real time. Another drawback worth mentioning is that Digital twins at the moment center on an individual or isolated part instead of integrating the whole system and no current work talks about this holistic approach. This paper will focus on Digital Twins in complex operations environments and their applications. A review of scientific literature on the use of Digital Twins in complex operations environments is performed and the articles are</p>

	<p>categorized by the problems and challenges that they address requiring DT as a solution. A selection of papers that focus on this topic and represent the current situation of research will be emphasized. In conclusion, this work will be utilized as a baseline study to propose a Digital Twin reference framework, which eventually leads to implementing and evaluating a comprehensive Digital Twin methodology in complex systems.</p>
<p>V110 15:30-15:45</p>	<p>Improvement of Pozzolan Properties of Oil Palm Boiler Ash Through Heat Treatment Yu Xuan Liew, Siew Choo Chin, Hui Jun Goh, Jolius Gimbut and Siti Asmahani Saad Presenter(s): Assoc. Prof. Ir. Dr. Chin Siew Choo, Universiti Malaysia Pahang, Malaysia</p> <p>Abstract: This paper presents the improvement of pozzolanic properties of oil palm boiler ash (OPBA) through heat treatment. The OPBA was obtained from oil palm mill in Pahang, Malaysia. The composition of OPBA was measured using X-ray fluorescence spectrometer which was used for its initial classification. It was found that, freshly obtained OPBA had high carbon content (33.9%) and cannot be classified as pozzolan with only 15.73% of Al₂O₃, SiO₂ and Fe₂O₃. Upon heating up to 600 °C for 2 h, the carbon content was eliminated and heated OPBA can be classified as pozzolan class F. When used as partial cement replacement, the 60-day compressive strength of OPBA-cement mixture peaked at 47.8 MPa for the pozzolan content of 15%. The compressive strength of OPBA-cement mixture decreases as the pozzolan content increases.</p>
<p>V363-A 15:45-16:00</p>	<p>Optimal Location of PMUs to Enhance State Estimation of Power Systems Abdullah I. Al-Odienat, Atallah Ahmad Al Qaralleh, Khaled Alawasa Presenter(s): Abdullah I. Al-Odienat, Department of Renewable Energy Engineering, Amman Arab University, Jordan</p> <p>Abstract: The Wide Area Monitoring Systems (WAMs) has brought several advantages for the power system monitoring, operation, control. Recently, the introduction of Phasor Measurement Units (PMUs) to power grids played a significant role in transforming them into smart grids. However, PMUs are costly and installing PMU at each bus is feasible. Therefore, the formulation of optimal placement of PMUs (OPP) in power systems is very important to minimize the total number, while preserving the observability of the system. Newton Raphson load flow method is applied to obtain load flow results of the system. Weighted least squares WLS with PMUs approaches for the state estimation of IEEE 14 bus test case is presented. The results show more accurate state estimation process.</p>

ONSITE SESSION 2

February 17, 2023 | GMT+0, London Time **14:00-16:30**

Logistics Warehousing & Enterprise Management

Session Chair: FH-Prof. Mag. DI Dr. Bernhard Heiden, Carinthia University of Applied Sciences, Austria

V114-A V231-A V115 V226 V117 V234 V235 V250 V365 V398

Location: Knox-Shaw Room

<p>V114-A 14:00-14:15</p>	<p>Effect of Cultural Proximity on Technological Distance Pattharaporn Wipatkrut and Hsin-Ning Su Presenter(s): Pattharaporn Wipatkrut, Institute of Management of Technology, National Yang Ming Chiao Tung University, Taiwan, China</p> <p>Abstract: This study examines how technological distance is influenced by the cultural proximity (i.e., cultural distance) among research and development collaborators. Firms should maintain innovativeness and enhance technological development by conducting collaborative research with external partners to exchange and transfer their resources. However, external partners may exhibit incompatibility and affect firm performance because of their different backgrounds; thus, cultural distance should be investigated. Cultural distance has been used to evaluate the cultural difference or similarity on the basis of Hofstede's dimensions. The results reveal that cultural distance has a significant and negative effect on technological distance because the differences in the environments, norms, and values of inventors can hinder collaborations and knowledge transfers.</p>
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<p>V231-A 14:15-14:30</p>	<p>Boosting firms' financial performance via digital transformation: How can digital leadership make a significant impact? Abdelhak Senadjki, Au Yong Hui Nee, Thavamalar a/p Ganapathy, Samuel Ogbeibu Presenter(s): Abdelhak Senadjki, Universiti Tunku Abdul Rahman, Malaysia</p> <p>Abstract: The Malaysian government is embracing digital transformation, as digital transformation has contributed to the growth of the Malaysian digital economy during the corona pandemic. According to a firm survey by Forrester, as of late 2020, only 46% of firms in Malaysia are adopting digital transformation, and 34% of firms plan to start the digital transformation in 2021). However, the performance is considered relatively poor due to a lack of knowledge and awareness about the digitization process, firms' understanding of digital transformation and maturity, and lack of knowledge and skills. This study evaluates the impact of digital leadership firms' performance via digitalization as an intermediate variable. Four hundred questionnaires were distributed to the respondents, and only 164 responses were collected. The present study entails the development of a structured questionnaire on the impact of digital leadership on Malaysian firms' performance. The questionnaire is designed based on a 5-point Likert-type scale. The data analyses and the hypotheses testing are conducted using SmartPLS 4 (Statistical Software for Structural Equation Modeling). Structural Equation Modeling (SEM) analyzes the data and answers the research questions. The findings showed that digital transformation and green organizational culture positively impact firms' financial performance. Green organizational culture, leader predictability, and leader vision positively impact digital transformation. Leadership capability, experience, predictability, and visions do not directly affect a firm's performance. However, they indirectly impact firms' performance through digital transformation. The results confirmed that digital transformation partially mediates the relationship between leadership capability, experience, predictability, vision, and firms performance.</p>
<p>V115 14:30-14:45</p>	<p>A case study for a digital twin of the material flow for automated inventory of load carriers with RFID Henriette Knapp, Giovanni Romagnoli, Dieter Uckelmann Presenter(s): Henriette Knapp, University of Parma, Italy; Stuttgart University of Applied Sciences, Germany</p> <p>Abstract: In the logistics of the automotive industry, special load carriers are used for the transport of special components. Special load carriers might be equipped with permanent RFID (Radio Frequency Identification) tags and thus can be uniquely identified. These RFID tags are read, for example, during automatic goods receipt posting with RFID gates. One challenge of production supply and logistics planning is to procure or replenish the right number of special load carriers because too many lead to unnecessary costs and too few can, in the worst case, lead to a production standstill due to a lack of material. Important Key Performance Indicators (KPIs) to support the decision on the replenishment of special load carriers are the circulation stock, which can deviate from the acquisition stock, as well as the real load carrier circulation factor. To the best of the authors' knowledge, these KPIs are unavailable in most information systems, and in publications found through a literature review, no digital twin is described that represents these KPIs. Therefore, this paper presents a methodology to generate a digital twin that maps the special load carriers and automatically calculates and visualizes important KPIs of material flow and load carrier management. This methodology is applied and verified using a case study in the body</p>

	<p>shop of an automobile manufacturer. The case study showed that for one load carrier type only 75 of the 120 procured load carriers are in circulation, and the real load carrier circulation factor differs from the calculated one. The digital twin has created transparency about these two KPIs for the first time, but the decision about replenishment must be made by experts on the basis of these data.</p>
<p>V226 14:45-15:00</p>	<p>Transitioning towards net-zero warehouses: empirical insights and best practices in Italy Sara Perotti, Martina Coslovich and Elena Granata Presenter(s): Prof. Sara Perotti - Politecnico di Milano, Italy</p> <p>Abstract: In recent years, sustainable warehousing has become more and more in focus among researchers and practitioners. On the one hand, practitioners – e.g. Logistics Service Providers (LSPs), manufacturers, and retailers – have been looking for solutions to decrease the environmental impact of their logistics facilities and incorporate practices and solutions towards greener warehousing processes. Still, on the academic side, although an increasing number of papers have been found addressing logistics sustainability, empirical evidence is lacking on sustainable warehousing, i.e. how are logistics facilities transitioning towards net-zero warehouses, what are the solutions and practices in place, and what are the related effects on warehouse environmental performance over time. This contribution aims at addressing this research gap. Based on an extensive longitudinal study in Italy, the paper discusses four best practices and illustrates their roadmap towards net-zero logistics facilities. Some key messages are elaborated, and streams for future investigation are highlighted. The main novelty of the work consists in discussing real business data related to warehouse environmental performance collected over a four-year timeframe and proposing some key findings as a starting point for future developments.</p>
<p>V117 15:00-15:15</p>	<p>Towards Big Data: Data Sharing Perception in the Malaysian Built Environment Sector Zafira Nadia Maaz, Shamsulhadi Bandi, Ainul Faqihah Abdul Fitri, Nazirul Fariq Presenter(s): Zafira Nadia binti Maaz, Universiti Teknologi Malaysia, Malaysia</p> <p>Abstract: There is a significant adoption rate of technology in the built environment (BE) sector to counteract the disruption caused by the pandemic. Globally, data sharing is recognized as an important precursor to the advancement of various technologies in the sector, such as big data. Various studies suggest quality and proactive decision making, cost management efficiency, and time and productivity improvement are among the potential benefits of data sharing. However, the BE sector faces critical challenges in sharing data particularly, across diverse construction organizations. This, this study aims to determine the key data sharing challenges among BE stakeholders in Malaysia. Using the Principal Component Analysis (PCA), which includes the Kaiser-Mayer-Olkin (KMO) and Bartlett' s Tests, findings identify four key data sharing challenges. The key challenges of data sharing are organization's interest and data management, data privacy and security, investments and incentives, and technology and data sourcing. This study concludes the criticality of an in-place data sharing mechanism to cater to the specific needs of the BE sector. The data sharing mechanism is viewed as a push factor toward creating a safe and effective data sharing environment. Consequently, this study aligns with the National</p>

	<p>Construction Policy 2030 (NCP 2030) and 2030 Agenda for Sustainable Development in embracing new technology, digitalizing processes, and building sustainable economic growth.</p>
<p>V234 15:15-15:30</p>	<p>Forecasting dining times in a full-service Thai hotpot restaurant Using Random Forest Classifier Pongjit Kongnim, Nagul Cooharajanane and Thira Chavarnakul Presenter(s): Pongjit Kongnim, Chulalongkorn University, Thailand</p> <p>Abstract: In the foodservice industry, time is a crucial factor that impacts both consumers and management. Machine learning (ML) is increasingly used to improve the quality of services through prediction. In this study, we aim to develop a model for predicting meal duration using Random Forest Classification algorithm. The study uses data from the Point-of-Sale (POS) system of a full-service Thai hotpot restaurant, with a focus on two commercial areas in Bangkok. The variables that we used include the branch, the number of customers, the number of items, the day of the week, and the time of the day. As a result, the overall accuracy of the model was 86% and the F1-score was 0.81. The discussion of the potential use of this approach in connection with the existing system in a restaurant could also be beneficial, aiding the restaurant in planning management more efficiently and gaining a better understanding of consumer behavior. This study will discuss the results of the model along with additional perspectives for future work.</p>
<p>V235 15:30-15:45</p>	<p>The impact of augmented reality on learning curves and mental workload: a preliminary experimental study Maurizio Faccio, Irene Granata and Leonardo Maretto Presenter(s): Maurizio Faccio, University of Padova, Italy</p> <p>Abstract: The learning process has always been fundamental in the industrial environment to correctly learn the right process and to perform it faster, increasing the efficiency by also minimizing the errors, consequently. Nowadays, new technologies that are emerging in this field are based on the augmented reality and, through a motion capture architecture, it is possible to realtime follow the operators' activities and to guide them in the next ones, improving the learning process. Therefore, this paper presents an architecture setup and the first preliminary tests, realized in the Industrial Plants and Logistics Laboratory of the University of Padua, in order to study the benefits that this type of technology can provide. The main findings are the decrease of the time required to learn the job along with a smaller operator' s cognitive workload during the training.</p>
<p>V250 15:45-16:00</p>	<p>Performance Evaluation of Virtual Network Service Function Deployment in Docker Containers Nithya Ganesan, Hrithik Sharma, Sahaj Vaghasiya, Prajwal Agarwal, Dev Patel, Prof. B. Thangaraju Presenter(s): NITHYA GANESAN, INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY, INDIA</p> <p>Abstract: Currently, using Container technology to host network functions can leverage faster Virtual Network Function (VNF)</p>

	<p>installation and optimize resource utilization than Virtual Machine (VM) based virtualization technology. When these network functions run inside a container, these software instances are often known as Cloud-Native Network Functions (CNF). Network providers use VNFs with different functionality in a chain to provide a service to the end user. A set of ordered VNFs is termed a Service Function Chain (SFC). The problem of placing and chaining VNFs of an SFC onto a network topology to minimize a cost function is known as SFC Placement and Chaining. This paper demonstrates how to solve the problem of SFC placement and chaining in a container-based environment. Multiple CNFs are used to create multiple service chains. These SFC have deployed on the National Scientific Foundation Network (NSFNET) topology. The SFC path is calculated using the Ant Colony Optimization algorithm. We have selected end-to-end delay and operational cost as the cost function that is minimized using the ACO algorithm. Performance metrics like end-to-end delay, operational cost, and throughput are recorded. We compare these results to the mathematical model to prove that the experimental and theoretical values are coherent with one another. These results benefit the network operators to do a cost-benefit analysis using the theoretical method, without wasting their time and resources on setting up a full-scale experimental setup.</p>
<p>V365 16:00-16:15</p>	<p>Applying Genetic Algorithm in ABC Analysis for Jewelry Raw Material Inventory Management Rungchat Chompu-inwai, Trasapong Thaiupathump Presenter(s): Rungchat Chompu-inwai, Chiang Mai University, Thailand</p> <p>Abstract: In raw material inventory management, the ABC analysis is an inventory classification method that categorizes an inventory into one of three groups based on the importance level. The ABC analysis is commonly used to identify items that have a strong influence on total inventory cost, while it is also used to identify different groups of inventory that will need different management and controls. Since the traditional ABC analysis takes only the annual use value in estimating the importance level, the result might not achieve the minimum total inventory cost. Inventory cost reduction is a greatly significant issue particularly in the case of high-value products such as those of a jewelry company. In this study, a genetic algorithm that accounts for multiple criteria in its fitness function evaluation is used in the classification process, in an attempt to find a solution that minimizes the overall inventory cost of a gold tube inventory dataset belonging to a jewelry company in Thailand. The company under study needs these three groups to provide different inventory policies based on their importance. The economic order quantity (EOQ) and safety stock (SS) levels at the specified service level for each gold tube type will be identified in finding the overall inventory cost. The fitness function for the genetic algorithm is then defined based on the overall inventory cost and the cost of shortages due to stock-out. The results show that, with an appropriate definition of the fitness function, the genetic algorithm can be applied in classifying the gold tube inventory in order to minimize the overall inventory management cost.</p>
<p>V398 16:15-16:30</p>	<p>Digital Detection of Acacia Mangium Trees via Remote Sensing for Controlling the Invasive Population of Biodiversity threats: Case Study in Brunei Moad Idrissi, Ahmad Wahab, Dalia El-Banna, Daphne Lai, Ferry Slik and Taufiq Asyhari Presenter(s): Ahmad Najiy Wahab and Taufiq Asyhari, Birmingham City University, UK</p>

Abstract: The growth of invasive Acacia Mangium has presented a new biodiversity threat to Brunei, which is situated on the biologically diverse island of Borneo. Hazards to the native flora due to Acacia's fast invasion and threats to forest fires have resulted in increased risks of burnable oil. In line with Brunei's National Climate Change Policy, which is reflected in Brunei Vision 2035, it is crucial to conserve Brunei's extensive forest cover by proactive management of the Acacia population in the country's tropical rainforests. Therefore, In line with Brunei's National Climate Change Policy, which is reflected in the Brunei vision, active management of the Acacia population in Brunei's rainforests is considered crucial as it can determine and scope out the country's extensive forest cover. To identify the species of Acacia tree and the coverage, this study uses UAV-based, high-resolution RGB photos that have been analysed by machine learning software. The images captured are tested and analysed using a convolutional neural network (CNN) model which is trained to detect the Acacia tree species highlighting regions that indicated a maximum accuracy of 84% based on the manually annotated datasets.

ONLINE SESSION 1

February 18, 2023 | GMT+0, London Time 09:30-11:50

Network Design and Application in Industrial Systems

Session Chair: Prof. Risty Acerado, Technological Institute of the Philippines, Philippines

Invited Speech V112 V230 V236 V252 V380 V404 V408 V406

Meeting Link: <https://us02web.zoom.us/j/81265045133> Password: 021618

<p>Invited Speech 09:30-09:50</p>	<p>CMATA: Cyber Trafficking Monitoring and Tracking Prototype Risty Acerado, Mauee Czelsie Samaniego, Roselia Morco Presenter(s): Prof. Risty Acerado, Technological Institute of the Philippines, Philippines</p> <p>Abstract: There are many unreported and unvalidated trafficking cases. The number of cyber human trafficking cases is still alarming despite the government's efforts. One apparent reason is that traffickers keep advancing their technical strategies, so it becomes more challenging for law enforcement to investigate complex and transnational organized crime. Thus, this paper presents a web application that identifies websites with a high probability of being used in cyber trafficking activities. The beautiful soup was determined to be the most suitable tool for developing web scraping algorithms based on performance, portability, and accuracy compared with the Scrapy and Selenium tools. Upon the first testing of the developed web application with the integration of the web scraping algorithm, it was able to scrape 45 potential trafficking websites.</p>
<p>V112</p>	<p>A case study to evaluate the diffusion of technological traceability systems: exploratory insights from south Italy agri-food companies Angelo Corallo, Martina De Giovanni, Maria Elena Latino, Marta Menegoli and Fulvio Signore</p>

<p>09:50-10:05</p>	<p>Presenter(s): Maria Elena Latino, University of Salento, Italy</p> <p>Abstract: Connectivity and technological evolution provide growth opportunities for companies in terms of improving processes controls, food safety and quality. Although technologies application is widely debated in the international research panorama, the agri-food companies' awareness in traceability technologies is not always well developed, leading to a low level of diffusion. This study focusing on evaluating the diffusion of technological traceability systems based on sensing technologies, smart labels, and blockchain and the propensity to use blockchain technology of agri-food companies. For this purpose, a case study was realized involving ten agri-food companies in the south Italy which were interviewed through an ad-hoc designed questionnaire. The performed analysis allowed to supply an exploratory picture of the current diffusion level of technological traceability systems in the micro companies of south Italy. The results show that there is little investment in traceability technologies in the companies surveyed, with only a few types of tracking technologies already adopted (Barcode and GFN). In contrast, the use of smart labels is completely absent, although knowledge of elements that could enable their development (such as blockchain technology) is partly well-established. Companies claim to be interested in their use, since them represents suitable vehicles for fulfilling market needs and, are willing to invest a reasonable amount of money in such technologies. This study allowed to validate the analysis tools, paving the way for the follow-up of the analysis on a national scale.</p>
<p>V230 10:05-10:20</p>	<p>Legacy Moderization: A Cloud Migration Strategy with Serverless Microservice Architecture Qi Zhi ANG, Peter ChunYu YAU, Chin Sean SUM, Qi CAO, Dennis WONG Presenter(s): Ang Qi Zhi, Peter Yau, Dennis Wong, Macao Polytechnic University, China</p> <p>Abstract: This paper provides an overview, presents the work- in-progress study of how software architecture can be modernized using the latest technologies. We will discuss the reasons why software modernization is required, how to choose an optimal solution from the architecture perspective, related migration strategy and the related points to note. The paper will also discuss some of the common issues faced while reviewing the architecture. These issues would provide some insights to some frequently faced problems in development and deployment. Finally, a discussion on how containerization technology and load balancer could help in resolving some of the common issues faced. In this paper, we have evaluated our proposed approach in a realistic case study involving an actual organization, which was anonymized for identity protection A certain organization would be used to provide the corresponding review mentioned.</p>
<p>V236 10:20-10:35</p>	<p>Internet of Things and Industrial Business Models: Knowledge Boundaries and Practical Implications Vito Del Vecchio, Marta Menegoli Presenter(s): Vito Del Vecchio, University of Salento, Lecce, Italy</p> <p>Abstract: Internet of Things (IoT) is recognised as a key enabling technology in Industry 4.0 for its ability to sense valuable data from physical things. It is also a disruptive driver for management strategies. Prior studies are mainly focused on the technological</p>

	<p>application and impacts of IoT in industries, neglecting its implications on business models. Considering such issue, based on a systematic literature review and a bibliometric analysis, this study aims to analyse the boundaries of knowledge related to the application of the IoT technology within business models, in order to reflect on and understand its most important intersection points and practical implications. Seven key topics that surround the meeting between IoT and business models emerged from the analysis, which were critically analysed in order to retrieve insights for academics, practitioners, managers.</p>
<p>V252 10:35-10:50</p>	<p>Introduce the CH role rotation mechanism in the multi-layered deterministic WSN clustering to achieve long-term load-balancing Othmane Dergaoui, Youssef Baddi, and Abderrahim Hasbi Presenter(s): Othmane Dergaoui, Mohammed V University in Rabat, Morocco</p> <p>Abstract: WSN clustering is a topology management mode which consists of grouping nodes into clusters according to a similarity criterion which is generally geographic proximity. This technique seeks to resolve several problems relating to the operation of WSNs, in particular high energy consumption and unbalanced load distribution. In this context, the multi-layered deterministic WSN clustering was set up, it aims at load balancing while reducing overall energy consumption. Admittedly, the technique envisaged allows to achieve an interesting level of loadbalancing between CHs over a single communication round, but the unbalanced distribution of loads between all the nodes of the network over several communication rounds is a problem which persists given that CHs consume more energy than member nodes. In this paper, we propose a CH role rotation mechanism in order to carry out long-term load-balancing between all the nodes of the WSN. The simulations done have shown that the CH role rotation mechanism can considerably increase the lifetime of the clustered WSN without adversely affecting the quality of the service provided to the end user.</p>
<p>V380 10:50-11:05</p>	<p>IoT Feature Assessment for Smart Cities via Intuitionistic Fuzzy Selected Element Reduction Approach (IF-SERA) Esra Çakır; Emre Demircioğlu Presenter(s): ESRA ÇAKIR, GALATASARAY UNIVERSITY, Turkey</p> <p>Abstract: IoT technologies implemented into congested cities surely improve society's quality of life. However, it is critical to accurately define the criteria for the adaptations of cities in this process and how to make an evaluation. While smart cities are graded based on assessment criteria such as energy savings, data quality and integrity, cloud computing, and management issues; it is also vital to consider which features will be effective and how much they will rate. This study evaluates IoT features of being smart cities by integrating Intuitionistic Fuzzy Selected Element Reduction Approach (IF-SERA), which is newly introduced to the literature for weighting criteria in decision-making problems in an intuitionistic fuzzy environment. This method is based on the impact of a chosen criterion on the findings, and then the weight is determined by eliminating it from the evaluation. Hence, while making an assessment, the criteria weights are not subjective, they take evaluation-specific values. Within the scope of smart cities, IoT criteria are ranked according to intuitionistic fuzzy decisions of the experts. With the case of IoT based smart cities, the</p>

	application area of the novel fuzzy weighting approach is investigated.
V404 11:05-11:20	<p>Predicting Cyber Trafficking Websites Using Naive Bayes Algorithm, Logistic Regression, KNN and SVM Aiza Jane Sulit, Risty Acerado, Ramon Christus Tomaquin, Roselia Morco Presenter(s): Aiza Jane Sulit, Technological Institute of the Philippines, Philippines</p> <p>Abstract: The global issue of combatting cyber trafficking continues to grow despite several laws being imposed and the different technologies utilized by the government. Thus, several researchers and software developers continue discovering the best approach to combat the rising cyber trafficking issues. This paper presents a classification model using four machine learning algorithms: the Naive Bayes Algorithm, Logistic Regression, K-Nearest Neighbor (KNN), and Support Vector Machine (SVM) to determine the trafficking and non-trafficking websites. In classifying trafficking and non-trafficking websites, the algorithm provided an accuracy rate of 91%, 81%, 64%, and 64%, respectively. Although all models appear to be at an acceptable rate, Naive Bayes stands out with the highest accuracy rate. The predictive model could be an effective tool to help law enforcement agencies to monitor human trafficking in a fast-growing cyberspace commu</p>
V408 11:20-11:35	<p>Customer Experience and Mobile Application Design Shuli Guo and Gerard Tocquer Presenter(s): Shuli Guo, School of Management, Asian Institute of Technology, Thailand</p> <p>Abstract: The technology of smart mobile devices supports new modes of communication between consumers and companies to co-create customer experiences. This research aims to study the effect of mobile application design factors on customer experience and the impact of customer experience on customer satisfaction based on the stimulus–organism–response framework in China's retail mobile commerce industry. The finding reveals that application design factors are positively related to customer experience and, thus, to customer satisfaction. This paper contributes to both academic and industry to have a better understanding on customer experience in retail mobile application design.</p>
V406 11:35-11:50	<p>Flood Forecasting using Edge AI and LoRa Mesh Network Mau-Luen Tham, Xin Hao Ng, Rong-Chuan Leong, Yasunori Owada Presenter(s): Mau-Luen Tham, Universiti Tunku Abdul Rahman, Malaysia</p> <p>Abstract: Remote flood forecasting has exponentially grown over the past decade together with the unprecedented expansion of Internet of Things (IoT) network. This is feasible with the use of long range wireless communication technology such as LoRa. Ideally, each LoRa device shall process the sensor data locally and trigger warnings to the remote server based on prediction results. However, conventional prediction methods rely on highly computational artificial intelligence (AI) algorithms, which are not suitable for low-powered LoRa network. In this paper, the LoRa device is integrated with an edge AI model, which is based on long</p>

short-term memory (LSTM) neural network. OpenVINO is adopted to optimize the LSTM model, before executing the solution on a Raspberry Pi 4 in combination with Intel Movidius Neural Computing Stick 2 (NCS2). Experimental results demonstrate the feasibility of deployment of the customized model on low-cost and power-efficient embedded hardware.

ONLINE SESSION 2

February 18, 2023 | GMT+0, London Time **09:30-12:00**

AI-based Information Management and System Analysis

Session Chair: Dr. Frida Betto, University of Padua, Italy

V102 V109 V116 V224 V229 V361 V382 V411 V409 V384

Meeting Link: <https://us02web.zoom.us/j/86532625469> Password: 021618

V102
09:30-09:45

Study on Battery Swap Station Location Decision and Order of Establishment Considering Multi Attributes Group Decision Making
Meilinda Fitriani Nur Maghfiroh, Elisa Kusriani and Chathumi Kavirathna
Presenter(s): Eng. Meilinda Fitriani Nur Maghfiroh, ST., MBA., Universitas Islam Indonesia

Abstract: The needs for green transportation accelerate the development of Electric Vehicle in Indonesia. As many obstacles are faced to encourage consumer to adopt EV, both government and industrial sectors tried to develop complementary infrastructure to support the green transportation program. Many EVs, especially two-wheeler, are required to charge their EV' s battery after it reach the driving range. However, the fast charging infrastructure build by government are extremely limited, while EV' s users are reluctant to use normal charging station. Battery Swap system is proposed by industrial sectors to fill the gap. The location of BSS, however, should be decide as industries have limited budget. This study attempt to understand the important criteria used for selecting the location of BSSs in Indonesia, in general. Furthermore, through multi decision-making attributes, we seek to also find out the order of establishment of the BSSs reflecting the driving range, the capacity limitation of EVs, and the budget availability of the related parties.

<p>V109 09:45-10:00</p>	<p>Supply Chain Risk Analysis for Organic Vegetable Farm in Indonesia Elisa Kusrini, Bayu Wahyudi, Palmadi Putri Surya Negara, Syarif Hidayatulloh Presenter(s): Elisa Kusrini, Islamic University of Indonesia, Indonesia</p> <p>Abstract: This research focuses on risk mitigation strategies in organic farming to achieve sustainable agriculture that considers profit, people, and environmental aspects. Various mitigation actions are proposed covering agricultural irrigation techniques, increasing the competence of farmers' human resources, procedures and management, and waste management. Risk analysis is carried out by identifying risks that arise in achieving key performance indicators and mitigating risks. Risk analysis using the house of risk method. A case study on an organic farmer in Indonesia was conducted. This study identified risk events that appear in the supply chain in organic farming based on 3 factors, namely 8 economic factors, 6 social factors and 5 environmental factors.</p>
<p>V116 10:00-10:15</p>	<p>Identifying Technology Opportunity in Science-based Industry: A Patent Analysis of Graphene Industry Xi Yang, Tianhua Fu, Xin Liu Presenter(s): Xi Yang, Center for Studies of Intellectual Property Rights, Zhongnan University of Economics and Law, China</p> <p>Abstract: In recent years, technological innovation research in the field of science-based technology has attracted fast-growing attention from both scholars and practitioners. However, the lack of technology opportunity discovery (TOD) in this field has always hindered the prosperity of science-based technology. Patent data can provide enormous and rich technological intelligence for stakeholders to investigate technological innovation activities and identify technology opportunity (TO). This study aims at proposing a patent-based approach to deeply analyze and dig out TO in the field of science-based technology. In order to verify the effectiveness of this approach, we take graphene, a typical science-based technology, as an example. Our result reveals that, firstly, many leading countries or regions have TO in overseas patent layout; secondly, most of the major patentees still have obviously TO of patent distribution in European markets, such as France, the U.K, and Germany; thirdly, most of the leading markets and major patentees have potential TO in the technological fields of construction materials, filaments and fibers, and coating compositions. Compared to the previous research, this study not only introduces TO research to the existing theory of science-based industry, but also makes up for the weakness of TOD in systematic research. This study has also important practical implications for researchers, practitioners, and policymakers in the field of graphene. We concluded that the proposed approach provides useful outcomes for TOD, decision-making and competitive advantage acquisition of various science-based technology fields.</p>
<p>V224 10:15-10:30</p>	<p>Learning to Rank: Performance and Practical Barriers to Deployment in Enterprise Search Colin Daly Presenter(s): Colin Daly, Adapt Centre, Trinity College Dublin, Ireland</p>

	<p>Abstract: In the field of Web Search (WS), Learning to Rank has become the machine learning method of choice for researchers interested in ranking. In addition to WS, ranking is also the primary challenge for engineers when deploying a new Enterprise Search (ES) service within an organization. This paper compares the implementation and performance of traditional, relatively simple methodologies such as BM25 with Learning to Rank and examines the common assumption that whatever method is best for WS must also be best for ES. We experiment on a small manually annotated dataset derived from a 'real world' ES service of a large organization. Results indicate that the nDCG@5 performance of one of the traditional methods (BM25-pf) falls just 6.1% short of the Learning to Rank method, with nDGC scores of 0.93 versus 0.99 respectively. Subsequently, we discuss implementation trade-offs between traditional and LTR methods and highlight the fact that traditional methods require far fewer deployment resources, as well as not requiring feature engineering, data preprocessing, or relevance judgements. A further advantage of the BM25 approach is that it does not entail an open-ended commitment for periodic ranking model retraining.</p>
<p>V229 10:30-10:45</p>	<p>Sourcing Strategies Analysis Under Supply Disruptions: a simulation approach Khadija Echefaj, Abdelkabar Charkaoui and Anass Cherrafi Presenter(s): Khadija Echefaj, Hassan First University of Settat, Morocco</p> <p>Abstract: Sourcing strategies are critical and strategic decisions in supply chain management. To deal with different risks and opportunities, companies should define a reliable sourcing strategy to ensure operations continuity. In this study, a simulation approach is used to analyze sourcing ways under negative as well as positive events. To that end, different scenarios are simulated and scrutinized through a case study. Results indicate that dual sourcing and backup supplier's strategies should be improved to ensure continuity. The results of this study could help managers to identify the best policy to purchase goods. Future research can focus on analyzing sourcing in the intertwined supply chains network.</p>
<p>V361 10:45-11:00</p>	<p>Gamification to Stimulate Green Behaviours in Cities Joyce Ngo, Emmanuel Fragnière, Blaise Larpin and Jean-Michel Sahut Presenter(s): Emmanuel Fragnière, HES-SO Valais-Wallis, Switzerland</p> <p>Abstract: Gamification is a new trend that has gained increasing importance in climate protection. In recent years, researchers have begun to integrate game elements into non-gaming contexts to encourage green behaviours. The city of Sierre jumped on the bandwagon and initiated a project aiming to use gamification to encourage its population to engage in green behaviours. The research focuses on identifying the barriers and motivators for people to engage in green actions in order to diminish or enhance them using games. Followed by a series of focus groups, 10 in-depth semi-structured interviews were conducted. Main result shows a significant gap between attitude and behaviour despite a high level of awareness and positive sustainable intentions. Based on research propositions that have been confronted to the scientific literature, Sierre has therefore collaborated with the HES-SO</p>

	Valais-Wallis to realise a gaming app on the theme of sustainable development for the population called ECOTREE.
V382 11:00-11:15	<p>Induction Stove Implementation for Sustainable Clean Energy Consumption: A Literature Study Dania Latifa Rizky, Retno Wulan Damayanti, Pringgo Widyo Laksono Presenter(s): Dania Latifa Rizky, Universitas Sebelas Maret, Indonesia</p> <p>Abstract: Sustainable and clean energy is a big issue in several countries, including Indonesia. This is the reason the Indonesian government focuses highly on the prioritization of clean and sustainable energy and an example of the efforts implemented is the conversion of 3 kg Liquefied Petroleum Gas (LPG) gas stoves to induction stoves. This program was considered due to its ability to reduce the 3kg LPG gas subsidy budget in addition to the reduction of large quantities of carbon gas emissions and fossil fuel usage. The first sector targeted was households because they are the main consumers of the 3kg LPG cylinders. The success of this program, however, requires studying the process of implementing an induction cooker for sustainable clean energy consumption. This was, therefore, initiated in this study by exploring previous literature on induction stoves and their implementation in Indonesia and several other countries. Data were collected using a systematic literature review approach. The results showed that induction stove technology has great potential to reduce CO2 emissions and the effect of greenhouse gases and this means it strongly supports the consumption of sustainable and clean energy. However, several challenges are associated with the conversion process in several countries, especially developing ones. This has led to the continuous formulation of strategies to accommodate these challenges some of which can be implemented in the induction cooker conversion program in Indonesia</p>
V411 11:15-11:30	<p>Development of Educational Content based on Augmented reality for Light Maintenance of Railway vehicle Jae Hwan Cha, Kyung Sik Kim, Chul Su Kim, Hwi Jin Kwon Presenter(s): Chul Su Kim, Korea National University of Transportation, Korea</p> <p>Abstract: Railway vehicle maintenance is performed in a work environment that requires high adaptability and expertise. Therefore, it is very important to systematically educate maintenance operators. However, maintenance education has been inefficiently conducted using booklet-type resources. Maintenance training should be conducted efficiently by visualizing the maintenance process in three-dimensional by applying the augmented reality (AR) technique. In this study, AR-based educational content was designed for a block brake device that induces an accurate position stop during train operation. To prove the effectiveness of the content, user experience evaluation was conducted through a survey consisting of 8 questions.</p>
V409 11:30-11:45	<p>Automated system for Hass avocado grading in the company “Jayanca Fruits S.A.C ” Jhans Miguel Cruz Mendez, Lady Katherine Melo Susanibar, Cedy Victoria Renojo De La Cruz, Ivan Llactahuaman Rodriguez, Herbert Antonio Vilchez Baca and Nabil Moggiانو. Presenter(s): Jhans Miguel Cruz Mendez, Universidad Continental, Peru</p>

	<p>Abstract: According to the National Institute of Statistics and Informatics in the period of 2021, avocado production was 62 thousand 744 tons, in which Peru has a share of 8.6% of world avocado production. This work develops an automated system for the classification of Hass avocados in the company "Jayanca Fruits S.A.C". For the simulation of the classification of ripe, unripe and overripe avocados, the bottleneck was determined by direct observation and then the neural network was programmed using roboflow software and the recognition of Hass avocados was trained in YOLO V5, to then obtain the simulation in Factory IO and TIA PORTAL with connection to PLC S7-1200 121 4DC/DC/DC and a HMI TP700. Finally the proposal of classification was implemented in which a 100% recognition of the avocados was obtained by means of the interactive screen of HMI, being able to classify it in an automatic way and to count them, which has a graphical environment so that the operator can manipulate, the bottleneck is eliminated and the productivity of the company "Jayanca Fruits S.A.C" is increased.</p>
<p>V384 11:45-12:00</p>	<p>Renewable Energy Adoption and Integration in South Africa: An Overview Hagreaves Kumba, Belinda Twite, Joseph Akpan and Oludolapo Olanrewaju Presenter(s): Joseph Samuel Akpan Industrial Engineering Department, Durban University of Technology, SA</p> <p>Abstract: The United Nations Sustainable Development Goal (SDG) 7 of ensuring access to affordable, reliable, sustainable, and modern energy for all is of critical importance to the development and growth of South Africa's economy. The ambition in SDG 7 is that by 2030 there should be universal access to affordable, reliable, and modern energy services. Electricity is an essential enabler of economic development that can lift people out of poverty therefore supporting sustainable development and industrialization. Improved access to energy in South Africa has the potential to alleviate poverty, promote industrialization and economic development. However, challenges with the state-owned energy utility company, Eskom, have resulted in the country experiencing regular power cuts. This article aims to provide a substantial review of the current renewable energy scenario in South Africa considering the faced challenges and their potential solutions for sustainable development. It will also highlight some of the progress on SDG7 integration, strategies and innovations in support to expedite South Africa progress towards universal energy access before 2030. The discussion serves as a guide to further investigate the development of renewable energy projects and the barriers to the implementation.</p>

ONLINE SESSION 3

February 18, 2023 | GMT+0, London Time **14:00-16:45**

Lean Manufacturing and Management Model

Session Chair:

V105 V243 V364 V258 V373 V375 V254 V379 V388 V393 V394

Meeting Link: <https://us02web.zoom.us/j/81265045133> **Password: 021618**

<p>V105 14:00-14:15</p>	<p>A Develop Model for Product Mix Planning in Manufacturing Industry using Multi-Objective Optimization Approach Ma. Teodora E. Gutierrez, Philip E. Ermita Presenter(s): Ma. Teodora E. Gutierrez, Technological Institute of the Philippines, Philippines</p> <p>Abstract: This paper develops a model for product mix planning in Manufacturing Industry using Multi-Objective Optimization (MOO) approach. The motivation of the project is to contribute to one of the sustainable development goals of United Nations (UN) that is to protect the planet by the reduction of production waste for every member country. This is in particular written in United Nation (UN) Sustainable Development Goals number 13 (SDG#13) which stated as “Take urgent action to combat climate change and its impacts” . The proposed model resulted in a pareto optimal for the achievement of the two objectives which are to minimize production cost and, at the same time minimize production waste. The model was tested in one manufacturing company, and it resulted in Pareto-optimal solutions. The Pareto-Optimal solutions identify the quantity of products to be produced at several production facilities in a specific time period and will set as the product mix plan of the case study company. The single function value of this multiple objectives’ optimization problem was computed through the minimization of the percentage deviation from the target values. The feasibility of the model and its effectiveness in achieving the goals of the company are demonstrated in the</p>
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	proposed formulated model.
V243 14:15-14:30	<p>Impact of Lean Tools in the Supply Chain: Pharmaceutical Industry Perspective Sebastián Aguirre-Manrique, Valeria Wong-Lam and Rafael Chávez-Ugaz Presenter(s): Sebastián Aguirre-Manrique, Valeria Wong-Lam, Rafael Chávez-Ugaz, Universidad de Lima, Peru</p> <p>Abstract: The aim of this paper is to identify the impact of the application of lean tools in the pharmaceutical supply chain (PSC) through a literature review. Supply chain inefficiencies before and during the COVID 19 pandemic, most applied tools, and lean improvements found in the PSC are identified. Databases such as Scopus and Proquest were used to collect the peer-reviewed articles to be studied. Results show the most frequent inefficiencies in the supply chain are found in operating costs, scrap rates, delivery times, and drug shortages. The improvements identified can be summarized in three factors: cost reduction, time reduction, and improvement in the management of activities. The most studied tools are Kaizen, Kanban, Total Quality Management (TQM), and Value Stream Mapping (VSM). Literature reveals that lean tools have a significant impact on quality improvement of information, products and/or services, as well as on the reduction or elimination of activities that do not generate value; in addition, there is little evidence of reduction of unnecessary movements of workers. The value of this paper addresses the impact of the pandemic on PSC, describing the versatility that each of the tools had in their role to reduce lean wastes. The versatility allows to identify which tool may be available according to the need of the practitioner.</p>
V364 14:30-14:45	<p>Production Model Based on Lean and TPM to Improve Total Productivity in an Agro-industrial Company. Isabella Zapater-Matos, Brunella Carlini-Camaiora, Martin Collao-Diaz Presenter(s): Isabella Zapater-Matos and Brunella Carlini-Camaiora, Universidad de Lima, Perú</p> <p>Abstract: This article aims to investigate the main reasons for the low productivity of agricultural companies, as well as to propose proposals for improvement based on lean tools, which are not yet well known in the field in question. Additionally, 40 scientific articles were analyzed to analyze the current situation, and proposals made satisfactorily in this and other sectors with lean tools, highlighting the 5S, TPM, standardization of work, and VSM as a fundamental tool for diagnosis and planning. Finally, to evaluate whether the tools are viable and beneficial, a pilot test was carried out in a small company named Santa Ana S.A.C in the agro-industrial sector in the north of Lima, Peru.</p>
V258 14:45-15:00	<p>Improvement model to increase productivity based on the application of SLP and Lean Manufacturing tools in a textile company Malena Del Rocío Serpa Osores, Jordan Yamil Cabrera Jerónimo Presenter(s): Malena Del Rocío Serpa Osores and Jordan Yamil Cabrera Jerónimo , Universidad Peruana de Ciencias Aplicadas, Perú</p>

	<p>Abstract: Currently, the textile industry worldwide is one of the most important for the development of emerging countries. However, like many industries, this is no stranger to the presence of various problems, the most frequent being low levels of productivity. Which influence the capacity that organizations have to satisfy the current demanding market. Therefore, in order to address this problem, a plant distribution improvement model was proposed based on the application of methodologies such as Lean Manufacturing and Systematic Layout Planning. From these, an increase in productivity rates was generated through the proper management of resources and processes under a continuous improvement approach.</p>
<p>V373 15:00-15:15</p>	<p>Production model based on Lean tools to increase the overall efficiency of the equipment in the sole pressing process of a footwear company Araceli Nicol Lucia Ortega Leguia, Lesly Fiorella Vargas Purizaca, Juan Carlos Quiroz-Flores Presenter(s): Araceli Nicol Lucia Ortega Leguia and Lesly Fiorella Vargas Purizaca, Universidad de Lima, Perú</p> <p>Abstract: The present investigation was carried out in a rubber soles production company in the footwear industry in Peru, which belongs to the manufacturing sector. In this sector, several problems affecting the Overall Equipment Effectiveness (OEE) of small and medium-sized companies were identified, either due to a large amount of downtime, low availability and performance of equipment, or low quality, among others; this study has its main objective to improve OEE according to the global industry standard (85%). The proposed solution implemented a production model in which SMED, TPM, and Poka-Yoke methodologies were applied. With this, the simulation of the current and the improved situation was carried out with the Arena software. Additionally, it was demonstrated that the proposed model improved the OEE to 86.17% because availability, performance, and quality improved to 95.85%, 89.95%, and 99.94%, respectively. Finally, this research was done to contribute to the sector's growth and to be a reference for companies with similar processes that want to increase OEE.</p>
<p>V375 15:15-15:30</p>	<p>Production model under the integrated approach of lean manufacturing and SLP to increase efficiency in a company of the metal mechanic sector Marcelo Augusto Barreto-Guillen, Mauricio Gonzales-Sassarini and Juan Carlos Quiroz-Flores Presenter(s): Marcelo Augusto Barreto Guillen and Mauricio Sebastian Gonzales Sassarini, Universidad de Lima, Perú</p> <p>Abstract: Metal mechanics plays a relevant role in the entire productive structure of the economy since it is an indispensable supplier of capital goods such as equipment, infrastructure, spare parts, and machines. However, the lack of efficient production processes, the high rate of defective products, and unnecessary routes in factories and production workshops are some of the frequent problems that companies in this area have that directly affect their productivity. Consequently, extreme routes and the profiling area have been identified as the main bottlenecks in the production process, impacting production efficiency. Therefore, the main objective of this case study is to demonstrate how the implementation of Lean tools has managed to increase the efficiency of the process for the production of thermoacoustic panels, reducing unnecessary routes and defective products. The proposed model</p>

	<p>comprises Lean tools such as the standardization of work and the 5S methodology, and the SLP was also applied to carry out the redistribution of activities. A simulation was carried out in the Arena software to validate the improvement proposal's results. The results obtained from the simulation were an increase of 19.24% in the overall efficiency of the process, a decrease of 42.4% in hours lost due to defective products, and a 26.7% reduction in downtime.</p>
<p>V254 15:30-15:45</p>	<p>Improvement model based on Work Standarization and TPM tools to increase on-time deliveries in a freigth transportation company Ester Olaya-Castillo, Jose Molleda-Romaní and Claudia Leon-Chavarri Presenter(s): Ester Olaya-Castillo, Universidad Peruana de Ciencias Aplicadas, Perú</p> <p>Abstract: Companies in the transportation sector have the problem of late delivery of goods. The average on-time delivery rate is 95%, but failure to meet this indicator could damage the company's credibility and customer satisfaction. Therefore, the motivation of this work is the combination of the application of Work Standardization and Total Productive Maintenance (TPM) for a transportation company since there are not many cases of application for service companies. The contribution is a methodology based on the tools of Work Standardization and TPM. Finally, a pilot test has been carried out and the main results have been the increase productivity in freight loading to 20.83%. In addition, the percentage of value-added activities in the loading process increased to 77.08%, the availability of the vehicle fleet increased to 86.40% and the Mean Time Between Failures (MTBF) increased by 9.67 hours per breakdown. With these improvements, the on-time delivery ratio improved by 9.64%.</p>
<p>V379 15:45-16:00</p>	<p>Operations management model based on mixed methodologies to increase production efficiency in a retail laundry Cesar Eduardo Neyra-Bravo, Fiorella Nicol Cupe Escalante and Juan Carlos Quiroz-Flores Presenter(s): Cesar Eduardo Neyra-Bravo and Fiorella Nicol Cupe Escalante, Universidad de Lima, Perú</p> <p>Abstract: Currently, the textile sector significantly impacts the country's economy in terms of its contribution to the GDP and the economically active population. Because of that, the problems that affect this sector have significant consequences for the rest of the people and the nation. Furthermore, in addition, the national and international competitiveness of the market forces companies to improve their processes and productivity at a fast pace. In this context, MSEs and SMEs, from which a large part of the economically active population originates, must be included in the search for increased productivity and efficiency in their processes. This Study aims to evidence how the use of mixed engineering tools will solve the problems above by improving the efficiency of production in operations of an SME Laundry from the textile sector. The improvement model proposed is based on TPM (autonomous maintenance, Planned maintenance), MRP, and Standardized work. In addition, The software ARENA simulator validated the results in the whole process observed in the study case. Eventually, the implementation obtained positive results, production efficiency increased by 13%, a decrease of 30% in the Stock out rate, and MTBF improved by 26.73% compared to the previous situation.</p>

<p>V388 16:00-16:15</p>	<p>Service Model Based on Lean Six Sigma and Queuing Theory to Increase NPS in a Healthcare Company Aderly Aquino-Quesquen, Gabriel Díaz-Campos, Martín Collao-Díaz Presenter(s): Aderly Milagros Aquino Quesquen and Gabriel Elías Díaz Campos, Universidad de Lima, Peru</p> <p>Abstract: Healthcare providers have often had low levels of patient satisfaction with their service, largely due to their perceived high wait times, which have the consequence of negatively impacting patient perception leading to a rejection of future care, thereby reducing potential future revenue for that provider. To correct this, the Lean Six Sigma methodology was used, a multifaceted process standardization tool based on analyzing the processes related to the operations in question and rejecting those that fail to create value for the consumer and at the same time minimize errors; Queuing theory, a mathematical model that allows predicting and optimizing queues and waiting lines given the number of customers in a system and the ability to meet their needs according to available capacity; and Process Simulation, which offers the possibility of converting real-life scenarios into virtual models, facilitating process predictions for better optimization of resources.</p>
<p>V393 16:15-16:30</p>	<p>Service model based on Lean Manufacturing, SLP and Process Standardization to increase the service level of an SME in the metal-mechanic sector. Fabrizzio Percy Llanos Reyes Randold, Korayma Flavia Flores Zorrilla and Martín Collao-Díaz Presenter(s): Fabrizzio Percy Llanos Reyes Randold and Korayma Flavia Flores Zorrilla, Universidad de Lima, Peru</p> <p>Abstract: SMEs in the metal-mechanic industry in Peru play a crucial role in the development of the country's economy due to their relationship with various industries providing intermediate and final goods, as well as their contribution to employment generation; however, Peruvian SMEs have several operational restrictions. Faced with this problem of lack of techniques and work strategies applied to SMEs in the metal-mechanic sector, the question arises as to the possibility of achieving an improvement in their OTIF in a competitive market. Therefore, the main objective of this research is to improve the attention times of a project in an SME of this sector with respect to a specific production line, through simulations in Arena and pilot tests. To achieve the proposed objective, a 3-stage methodology is proposed: Analysis of the current situation, development of tools and implementation and evaluation of indicators, where the Lean Five "S" and Poka Yoke tools are applied, the standardization of the quality process (ISO 9001) and the SLP analysis. From the research, it could be concluded that by improving the layout of the factory, implementing quality procedures and improving the organization of tools, an increase of 39.29% in the OTIF was achieved; that is, from 53.57%, 92.86% was achieved.</p>
<p>V394 16:30-16:45</p>	<p>Service Management Model based on Lean Manufacturing and SLP to improve the Service Level in a company of the Metalworking Sector Arazely Melendez-Choque, Emilio Garofolin-Lozano, Martín Collao-Díaz Presenter(s): Arazely Melendez Choque and Emilio Garofolin Lozano, Universidad de Lima, Peru</p>

Abstract: The metalworking sector has had remarkable growth in recent years, which has a great influence on the country's economy. However, there is no adequate level of service in Peru, since it currently has 67.62%, when the standard is 85%, this originates due to several factors, the delay in the dispatch threads, non-compliance with orders, disorder in the warehouse, among others. According to the above, it is necessary to plan an adequate service management. For this reason, a service management model based on Lean Manufacturing tools (5S and Standardized Work) and SLP was developed to improve the level of service in the aforementioned sector. The model was validated through the Arena software where an increase in the level of service from 75% to 91% was obtained, a reduction in effort and distances traveled thanks to the use of SLP, and a significant increase in the audit rating through 5S. The results obtained show the effectiveness of the proposed model to improve the level of service in the metalworking sector.

ONLINE SESSION 4

February 18, 2023 | GMT+0, London Time **14:00-17:00**

Production System Monitoring and Management Standards

Session Chair: Prof. Emmanuel Fragnière, HES-SO, Switzerland

V391 V259 V374 V101 V111-A V376 V400 V413 V415 V387 V223

Meeting Link: <https://us02web.zoom.us/j/86532625469> Password: 021618

<p>V391 14:00-14:15</p>	<p>Perceived Usefulness, Perceived Risk and Trust towards Intention to Use Induction Stove: A Case Study on Pilot Project of Induction Stove Conversion Program in Surakarta Amanda Syifa Ariqoh, Pringgo Widyo Laksono, Retno Wulan Damayanti Presenter(s): Amanda Syifa Ariqoh, Sebelas Maret University, Indonesia</p> <p>Abstract: One of the factors that determines a consumer's intention to use a product is their perception of it. To determine whether a product is accepted by the community, a product provider must take into consideration the public's intention to use of the product. This research focuses on the pilot project of induction stove conversion program in Surakarta, Indonesia. The objective of this pilot project program was to convert from the use of gas stoves to induction stoves as a strategy for Indonesia to transform energy into cleaner and also more environmentally friendly energy. Therefore, this research resolves that problem by analyzing the effect of perceived usefulness, perceived risk, and trust towards the intention to use induction stoves using the partial least squares structural equation modeling (PLS-SEM) method. Using this method, the significance of the influence and the analysis of the influencing factors can be determined. Results from PLS-SEM using SmartPLS indicate that the perceived usefulness of induction stoves influences trust and intention to use. Trust has an inverse relationship with perceived risk and influences positively in intention to use</p>
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	<p>induction stoves. Perceived risk negatively influences directly in intention to use. The results suggest that companies should plan for another socialization, as well as provide supporting facilities so that information about induction stoves is informed well. This paper contributes to a more comprehensive understanding of the influence of related variables on intention to use in pilot projects.</p>
<p>V259 14:15-14:30</p>	<p>Reduction of stock-outs using forecasting, EOQ system and FEFO method in a Peruvian pharmaceutical company Johnny Vicente-Regalado, Adriana Villanueva-Abregú, Alberto Flores-Perez Presenter(s): Johnny Vicente-Regalado and Adriana Villanueva-Abregú, Universidad Peruana de Ciencias Aplicadas, Perú</p> <p>Abstract: This study analyzed the supply management in a pharmacy in Lima in view of the problem of the depletion of pharmaceutical products which represented 9.5% during 2021 and generated an economic loss of PEN 40,374, which is equivalent to 14.8% of the annual billing. The main objective was to reduce stock breaks to improve the profitability of the pharmaceutical establishment. The motivation of the study was to reveal the effectiveness of three logistics tools such as demand forecasting techniques, the EOQ model to achieve optimal order levels and the FEFO method to organize medications according to their level of rotation and expiration. To do this, a preliminary review of success stories that suggest various inventory models was carried out. Thus, the contribution of the study was based on a comprehensive design of three methods for inventory management that allows increasing knowledge in a new field of application such as pharmaceuticals. The proposal was validated with the Arena simulator and the results demonstrated its effectiveness by reducing stock breakage to 3.4% and achieving economic viability with a NPV equal to PEN 5,177. In conclusion, the proposal achieved an improvement in the availability of medicines in the pharmacy and a positive economic impact.</p>
<p>V374 14:30-14:45</p>	<p>Production management model based on SLP, 5S, and Standardized Work tools to increase OTIF rate in a shoe repair shop Ernesto Bernardo-Saavedra, Miguel Angel Carpio-Nájera and Juan Carlos Quiroz-Flores Presenter(s): Ernesto Bernardo-Saavedra and Miguel Angel Carpio-Nájera, Universidad de Lima, Perú</p> <p>Abstract: The footwear manufacturing industry in Peru is recovering from the economic crisis generated by the COVID 19 pandemic. Proof of this is the survival of companies with an efficient inventory management, production plan and quality of the product or service offered. The main objective of this research is to know the impact of Lean, SLP and SW tools on the efficiency of a footwear handicraft workshop. The importance of the research is to provide a solution to the low efficiency of the workshops, mainly due to the poor distribution of the workstations that generated many unnecessary transfers and unproductive idle times that generated delays and waiting times. The proposed improvement model was composed of the following tools: Systematic Distribution Planning, 5S and Work Standardisation. In addition, the Arena simulation tool was used to evaluate the results and validate the improvement proposal. As a result, 79% of the OTIF efficiency indicator was achieved, effort was reduced by 40.6% and cycle time by 2%.</p>
<p>V101</p>	<p>Improving the process for interlocking bricks production for SMEs scale in Thailand: a case study</p>

<p>14:45-15:00</p>	<p>Narucha Tanaiutchawoot, Sarayut Phonthep, Kijja Somrunjit and Chakrit Hongsrirong Presenter(s): Ing. Narucha Tanaiutchawoot, Suranaree University of Technology, Thailand</p> <p>Abstract: Interlocking bricks are popular because of their properties and construction method. The market demand is high, leading to the establishment of many companies. Many small companies have emerged in Thailand, especially in provincial regions such as Nakhon Ratchasima. They have no standard for developing the manufacturing process. Due to spatial and economic constraints, most enterprises rely on mechanical equipment and physical labor. In this study, the knowledge of industrial engineering was applied to assist small enterprises to improve the quality of interlocking bricks production by applying an ergonomic theory to analyze the work attitude and activities of employees. The FlexSim application was used to design and analyze the new process for interlocking brick production. The analysis showed that the analysis, employee working position of the employees at one station can lead to injuries. The height of the table at this station should be modified to improve the workers' posture and reduce workplace injuries. The new production process designed in FlexSim increases production volume by 24.075%. Thus, these two methods are potential methods to help small businesses analyze and manage production quality improvement in a short time and with a limited budget.</p>
<p>V111-A 15:00-15:15</p>	<p>Influence of Matte Finish in Car Exterior Design on Perceived Color Quality Takumi Kato Presenter(s): Takumi Kato, Meiji University, Japan</p> <p>Abstract: Styling tends to receive considerable attention in product design, but this does not guarantee results commensurate with the investment. On the other hand, perceived quality can be improved reproducibly by investing time and money. The perceived quality in industrial design consists of CMF (color, material, and finish). Although previous studies have explored the impact of color and materials on consumer behavior, there are few studies on the impact of finishes. The research question for this study is: Does the matte finish offered as an option by automakers affect perceived color quality? For the survey, a car with SUV styling was produced, and three exterior colors, black, red, and silver, were prepared. Then, three levels of matte finish were created for each color. Thurstone's paired comparison was conducted in an online survey that targeted the Japanese market. Contrary to expectations, the matte finish had a negative effect on all colors. The results appeal to practitioners who do not rely blindly on conventional industry knowledge. Because the subjective evaluation of consumers determines perceived quality, there is a risk of making erroneous decisions if the value is not judged based on the sensibility of the target customer.</p>
<p>V376 15:15-15:30</p>	<p>Research Trends in Mobile Robots: A Comparative Analysis within the Periods Before and After the Industry 4.0 Revolution Sezer UĞUZ, Barış ÖZYER, Ahmet COŞKUNÇAY Presenter(s): Sezer UĞUZ, Atatürk University, Turkey</p> <p>Abstract: Mobile robots are at the forefront of studies in the field of robotics. Research topics such as path planning and task</p>

	<p>planning take place importantly in the field of mobile robots. In this study, papers in the field of mobile robots in the last 20 years are discussed. The abstracts of 13,404 papers in the Scopus database were analyzed in two 10-year periods between 2002-2011 and 2012-2021, before and after 2011, when the Industry 4.0 Revolution emerged. Analysis results were created by text mining method. According to the results of the analysis, the research topics named Path Planning Algorithm and Automated Guided Vehicles in Industry were among the topics that attracted attention. As a result of these analyses, changes in research areas with developing technologies were shared with both academic and industry stakeholders for future study.</p>
<p>V400 15:30-15:45</p>	<p>Integrated production/inventory and condition-based maintenance control of a multi-item production system under stochastic demand Alp Darendeliler, Dieter Claeys and El-Houssaine Aghezzaf Presenter(s): Alp Darendeliler, Ghent University, Belgium</p> <p>Abstract: This paper studies the joint production/inventory and condition-based maintenance control for a multi-product manufacturing system with setup and maintenance times under stochastic product demands. The problem is modelled as a semi-Markov decision process (SMDP). The objective is to find a joint production and maintenance policy that minimizes the long run expected discounted cost including setup, holding, lost sales, preventive and corrective maintenance costs. A Q-learning method with state aggregation (QLA) is proposed to find near-optimal policies for large-scale problems that cannot be solved to optimality due to the curse of dimensionality. The numerical results show that QLA provides well-performing policies in a reasonable computational time.</p>
<p>V413 15:45-16:00</p>	<p>Automation of hydrogen production and automatic filling control Maryory Mitsu Jimenéz Valenzuela, Fabiola Margharet Salazar Pacheco, Alvaro Josué Meza Terreros, Ivan Llactahuaman Rodriguez, Jhon Rodrigo Ortiz Zacarias, Herbert Antonio Vilchez Baca, Nabil Moggianno and Carlos Coaquira Rojo Presenter(s): Maryory Mitsu Jimenéz Valenzuela, Universidad Continental, Peru</p> <p>Abstract: According to the Ministry of Energy and Mines (MINEM) in the period 2021 the energy production was 57371 GWh, this consumption can be covered with hydrogen green energy being a clean and environmentally friendly energy vector. This work develops the automation of hydrogen production and automatic filling control. For the simulation and design of the hydrogen plant, FlexSim and Value Stream Mapping were used to improve the production processes, while for the hydrogen balloon filling and transport stage, Factory IO and TIA PORTAL software were used to obtain a filling control, which is optimal for this process. Finally with the first simulation a total cycle of 28710 was obtained with a tak time of 137.38 seconds / hydrogen cylinder, so in the hydrogen production that the simulation was carried out, 28 units of hydrogen were obtained in 12 minutes with 3 seconds, which is equivalent to 4 hydrogen cylinders produced.</p>

<p>V415 16:00-16:15</p>	<p>Performance management practices and coaching projects: a survey Frida Betto and Patrizia Garengo Presenter(s): Frida Betto, University of Padua, Italy</p> <p>Abstract: In the last few years the business environment has become even more challenging for organizations. Industry 4.0, crisis, and the competitiveness of markets stimulate scholars and practitioners to investigate deeply how to improve and sustain performance. Under this current scenario research on performance measurement and management (PMM) practices has rapidly increased. Notwithstanding the role of coaching within organizations, no study until now investigates empirically its effects on PMM practices. Our study by a survey of a large sample of coaches, shed light on the key PMM practices enhanced by coaching in order to achieve a sustained performance over time.</p>
<p>V387 16:15-16:30</p>	<p>Cost-Efficient SFC provisioning in Container Environment Nithya Ganesan, Nachiappan S K, Prateek Kamboj, Prof. B. Thangaraju Presenter(s): Nachiappan S K, International Institute of Information Technology, India</p> <p>Abstract: As an alternative to virtualisation, containerisation has emerged as a significant trend in software development. Their introduction provides for the reduction of costs, time, and energy. A service function chain (SFC) in a container is a collection of sequentially ordered container network functions (CNFs). To efficiently implement CNFs in a network, the SFC placement problem must be solved. SFC placement is primarily concerned with placing the CNFs of an SFC into the appropriate container and chaining them together in accordance with specific SFC requirements. In order to make good use of available network resources and ensure network service performance, network operators must strategise the placement of SFC. Our paper aims to optimise End-to-End delay, minimise operational costs, and increase the acceptance rate when placing SFCs in containers. These requirements must be met by network operators in order to optimise resource consumption and provide better service to end users. Thus, we have formalised the SFC chaining and placement problem in a mathematical model and minimised the operational cost using the proposed Mixed Integer Linear Programming (MILP) model. This paper shows that with the use of CNF, we can further optimise the SFC placement and reduce the operational cost, which, when evaluated, came out to be around 12% less than SFC placement using VNF.</p>
<p>V392 16:30-16:45</p>	<p>Experimental Investigation and Multi- response Optimization of Process Parameters of Electrical Discharge Machining on H21 Steel Using TOPSIS-GRA-CRITIC Method Sandeep Kumar, Abhishek Singh, and Rahul Davis Presenter(s): Abhishek Singh, Department of Mechanical Engineering, National Institute of Technology Patna, India</p> <p>Abstract: The efficiency of optimizing numerous response parameters of electrical discharge machining is investigated in this study with the assistance of grey relational analysis (GRA) and the approach for the order of preference by similarity to the ideal solution</p>

	<p>(TOPSIS) coupled with the criteria importance through criteria inter-correlation (CRITIC) method. The study considered polarity, peak current, electrode material, pulse on time (Ton), pulse off time (Toff), electrode material, polarity, and dielectric as the process parameters while using material removal rate, surface roughness, and tool wear rate as response parameters. First, Taguchi's L18-OA was used to execute the experiments, and the response parameters were then recorded. The analysis of variance (ANOVA) was carried out to determine the influential parameter with 95% confidence level. The findings indicate that the optimal parametric settings were 2A peak current, 60μs Ton, 60μs Toff, copper electrode material, reverse polarity, and distilled water dielectric using the GRA-CRITIC method, and 4A peak current, 30μs Ton, 20μs Toff, brass electrode, reverse polarity, and kerosene dielectric using TOPSIS CRITIC. The Peak current was found to be the most influential parameter, contributing 25.19% to the performance measures, followed by Ton, Toff, electrode material, polarity, and dielectric, contributing 24.45%, 13.42%; 13.04%, 9.45%, and 6.23%, respectively. Furthermore, the ANOVA of preference values revealed that Toff had the maximum influence on performance measures, contributing 24.55% of the performance measures, followed by peak current (16.30%), polarity (10.67%), Ton (6.67%), electrode material (4.57%), and dielectric fluid (6.57%). Confirmatory tests were run on the derived optimal values, and the findings indicated that the final improvements in the preference and grey grade values were 0.008016 and 0.006728, respectively. In addition, regression analysis was performed to evaluate the relation among the machining variables.</p>
<p>V223 16:45-17:00</p>	<p>Online Optimal Resources Mix of Power System using Dizzy Dragonfly Algorithm Soraphon Kigsirisin Presenter(s): Dr. Soraphon Kigsirisin, Metropolitan Waterworks Authority, Thailand</p> <p>Abstract: Online Resources Mix (ORM) consisting of wind turbine generators (WTGs), photovoltaics (PVs), battery energy storage systems (BESSs), fuel cell generator (FC) and the external sources plays a vital role in supplying electricity to production processes of modern manufacturing plants. In this study, the power system of the two raw water stations (RWSs) at the Mahasawat Water Treatment plant (MHS) is studied and modified to utilize ORM. Then, developed from Dragonfly Algorithm (DA), Dizzy Dragonfly Algorithm (DDA) is proposed for dragonflies to follow the new movement characteristics to gain supreme performances in swarms. This aims to discover the excellent optimal power of ORM for RWSs through the minimization of the total cost of operation and maintenance, fuel, and electricity commercialization between RWSs and the external source, as the objective function of this study. The Time-of-Use (TOU) tariffs are considered on the commercialization cost. As a result, DDA provides the best total cost over the cost by DA and the other referred optimization algorithms.</p>

Thank You!
See You Next Year